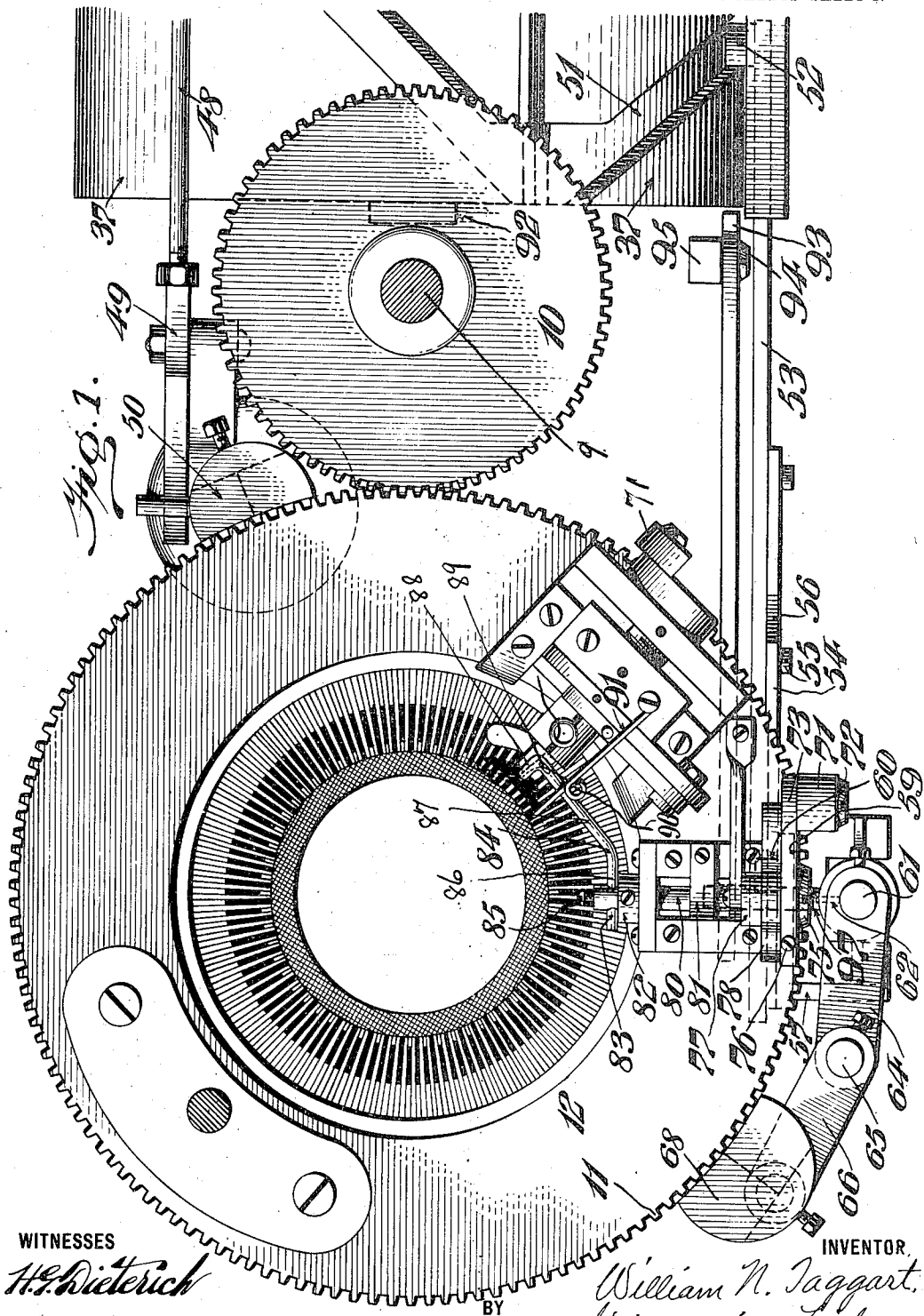


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3 SHEETS-SHEET 1.



WITNESSES

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L. Rouville

BY

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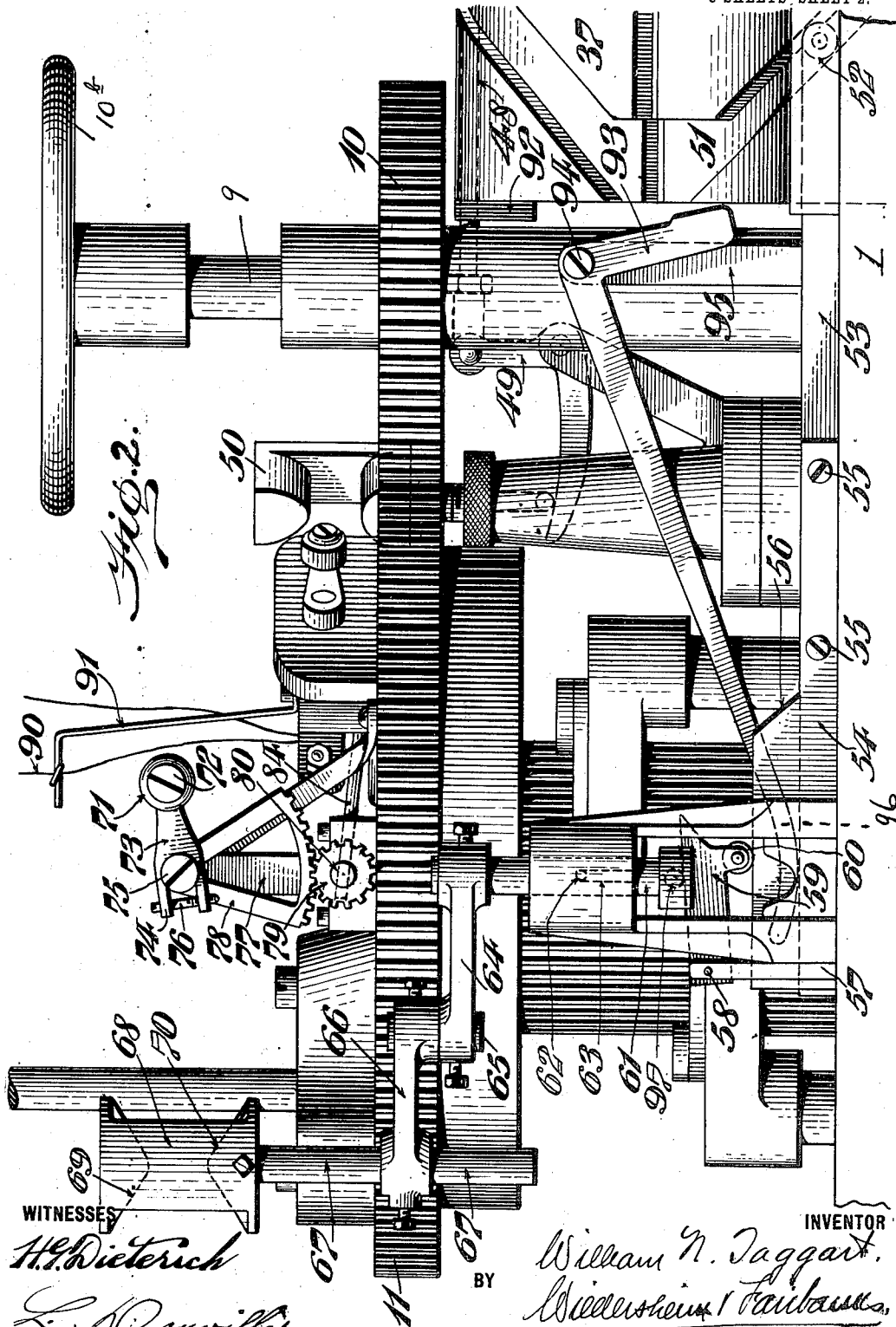
ATTORNEYS

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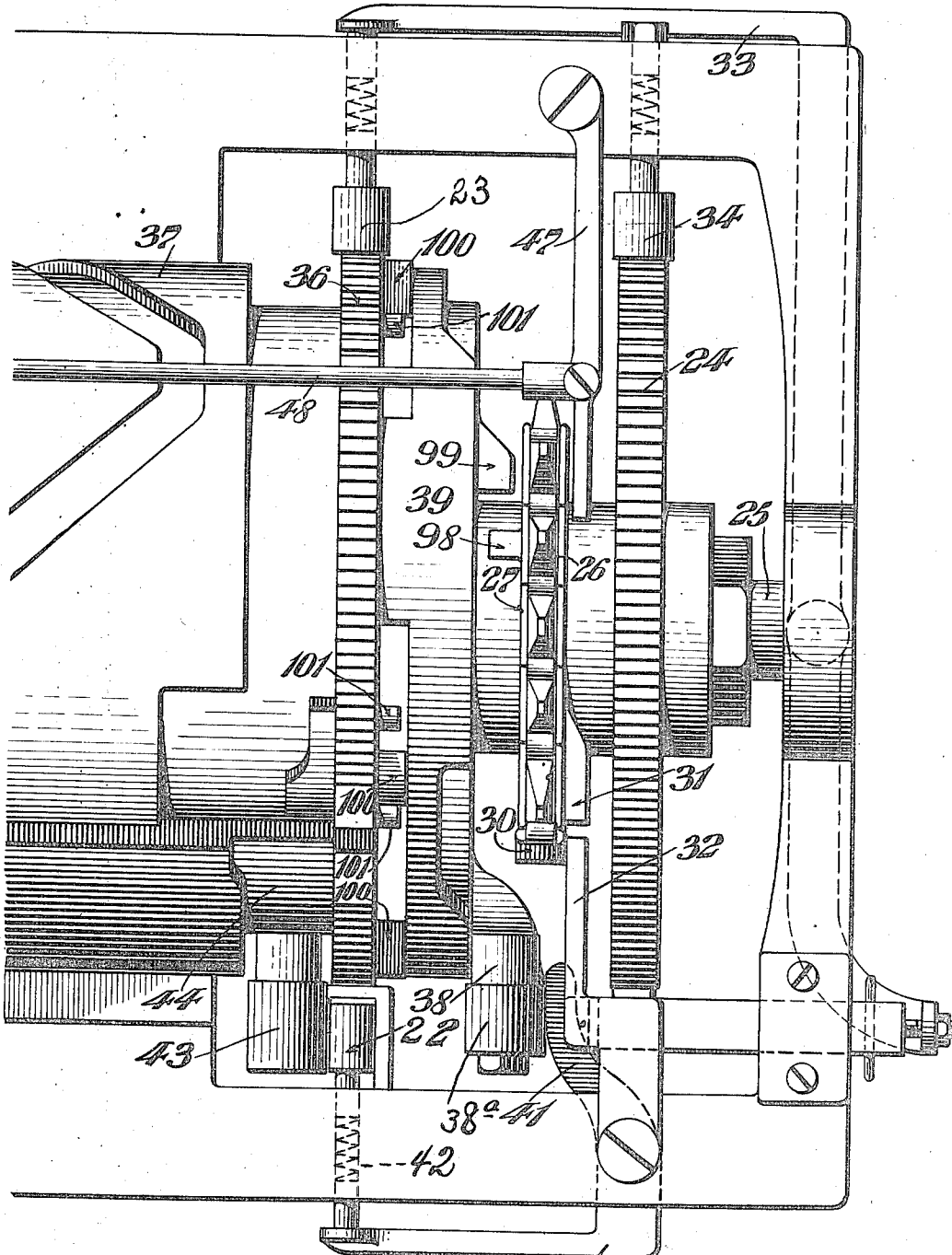
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3 SHEETS-SHEET 3.



WITNESSES

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Fig. 3.

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SPLICING MECHANISM FOR KNITTING-MACHINES.

1,044,943.

Specification of Letters Patent.

Patented Nov. 19, 1912.

Application filed July 24, 1911. Serial No. 640,264.

To all whom it may concern:

Be it known that I, WILLIAM N. TAGGART, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Splicing Mechanism for Knitting-Machines, of which the following is a specification.

One of the main objects of my present invention is to devise a novel splicing mechanism for knitting machines wherein at the proper time a splicing or reinforcing thread is automatically brought into operative position and at the proper time moved out of its operative position, whereby the heel, toe, and garter portions of a stocking or similar article will be reinforced.

Another object of my invention is to devise a novel construction of a splicing mechanism in which such mechanism will be positively driven, thereby enabling me to dispense with the use of springs or their equivalents, and thereby prevent the splicing mechanism coming into contact with the needles in case the spring becomes weakened or broken, so that I am enabled to prevent in a positive manner the breaking of the needles from such cause and the resultant defective articles.

A further object of my invention is to devise novel means for moving the arm which carries the splicing thread above the path of the needles.

With the above and other objects in view, which will more clearly hereinafter appear in the detailed description, my invention consists of a novel construction of a splicing mechanism and novel means for controlling the operation thereof.

It further consists of a novel construction of an arm or guide for the splicing thread, novel means for supporting such arm or guide, and novel means for causing the same to be automatically moved at predetermined times into and out of its operative position.

It further consists of other novel features of construction as will be hereinafter more fully set forth.

For the purpose of illustrating my invention, I have shown in the accompanying drawings one form thereof which is at present preferred by me, since the same has been found in practice to give satisfactory and reliable results, although it is to be under-

stood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

In the drawings: Figure 1 is a plan view, partly in horizontal section, of a portion of a knitting machine constructed in accordance with my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a plan view of the portion of the machine not shown in Fig. 1.

Similar numerals of reference designate corresponding parts in all of the views, referring to which;

1 designates the frame of the machine, and 9 is a shaft journaled in the frame 1 and provided with a gear 10 which latter coacts with a gear 11 to actuate a sinker ring 12. The shaft 9 is also equipped with a hand wheel 10^b, Fig. 2.

In common with machines of the class described in the Franck Patent #536,616 of April 2, 1895 and the Franck Patent #656,538 of August 21, 1900 and similar machines extant the machine embodying my invention comprises a drum 37, a shaft 25, ratchet wheels 24 and 36, a cam 39, a sprocket wheel 26, a pattern chain 27 which latter extends around the sprocket wheel 26 and is actuated in the conventional or in any other suitable manner compatible with the purpose of my invention, and reciprocating pawls 22 and 23. The pawl 22, Fig. 3, is normally held to its work by a spring which upon such occasions is in compression.

The outer end of the spring 42 is acted upon by one arm of a bell crank lever 42^a of which the other arm is engaged by a shipper-lever 38^a. Said lever 38^a controls the belt-shipper mechanism and is provided with a roller 38 that runs on the edge of the cam 39 so that when the roller 38 drops into a low part of the cam 39 the shipper mechanism of the machine is caused to operate in the usual manner as will be understood from the Franck Patent 536,616 *supra*. The arm 41 of the bell crank lever is held in contact with the shipper lever 38^a so that when the latter falls into a low part of the cam 39, the arm 42^a swings outward, releasing the spring 42, thus permitting the pawl 22 to clear its ratchet wheel and become inoperative. The

pattern chain in the present instance is provided with operating cams or members 30 and 21 as will be understood by reference to Fig. 3. The cam 30 is adapted to cause the outward movement of the plunger 32, which latter controls the movement of the pivoted lever 33, which latter acts on spring pressed pawl 23 co-acting with the ratchet wheel 36, carried by the drum 37. 34 is a spring-pressed pawl co-acting with the ratchet wheel 24. 43 designates a lever controlled by a cam portion 44 or drum 37. The cam 31 on pattern chain 27 is adapted to actuate a pivoted lever 47, which latter has connected therewith a rod 48, to which latter is connected a bell crank 49 Fig. 2 adapted to control a reversing mechanism 50 to vary the tension. The drum 37 is provided with cam grooves 51 in which is adapted to travel a roller 52 (see dotted lines in Fig. 2) carried by an arm 53, whereby the latter is reciprocated in the usual manner.

54 is a cam member secured to the arm 53 by means of fastening devices 55 and provided with a cam face 56.

57 designates a stationary bracket to which is pivoted at 58 a block 59, which latter has mounted therein a roller 60, which coöperates with the cam 54 to cause the block 59 to maintain the rod 61 in its upper position; said rod being provided with a pin 62, adapted to travel in a vertical groove 63 in the bracket 57 to prevent rotation of the rod 61.

64 is an arm secured to the rod 61 and also connected with a rod 65, to which latter is also connected an arm 66 adapted to adjustably carry the stem 67 of the reversing member 68, which latter is provided with the upper and lower reversely inclined faces 69 and 70 respectively.

71 designates a roller adapted to coact with faces 69 and 70, said roller being mounted on a stud shaft 72 carried by an arm 73, which is provided with a forked or slotted end 74, thereby adapting the same to be secured to a shaft 75 by means of a fastening device 76. The shaft 75 is carried by a bracket 77 fixed on the sinker gear 11 and mounted on the shaft 75 is a gear segment 78, the teeth of which mesh with a pinion 79 fixedly mounted on a shaft 80.

81 designates a spring which as seen in Fig. 1 in the present instance is a flat spring, having one end fixed while the free end thereof, bears against the upper side of shaft 80 to prevent casual movement of the parts.

82 Fig. 1 designates a set collar adjustably carried by the shaft 80 and maintaining the latter in its proper assembled position. The inner end of the shaft 80 is apertured as indicated at 83, thereby adapting the same to receive the splicing thread guide 84, which latter is secured in adjusted posi-

tion with respect to the shaft 80 by means of the set screw 85. The guide 84 comprises a straight portion 86 as will be understood by reference to Fig. 1 from which the guide extends forwardly at an angle thereto as indicated at 87 and from the forward portion of the extension 87 the guide is angularly deflected as indicated at 88, and this deflected portion 88 is provided with an aperture 89 extending therethrough, it being understood that the splicing thread 90 passes through a suitable guide 91 fixed on the sinker gear 11 and then through the aperture 89 in the splicing thread guide 84. The end of the guide 84 is normally exterior to the line of the needles but when said guide is rocked with the shaft 80 so as to move upward the end of the guide will swing in a vertical plane so that in the uppermost position of the free end of the guide 84 the splice thread instead of being held exterior of the circular line of the needles is within the tube which is being knit. The drum 37 is provided with a cam face 92, Fig. 2, which controls the movement of a lever 93 pivoted at 94 to a standard 95 forming a part of the frame 1. The forward lever 93 is provided with a curved forward portion 96, Fig. 2 which coöperates with a lateral pin, 97 secured to the rod 61, whereby at predetermined times said rod will be raised and maintained in raised position. The pattern chain 27 is provided with a lug or cam member 98, Fig. 3, which co-acts at a certain time with a cam 99 carried by the cam member 39 so as to rotate the latter and move the lugs 100 into engagement with the pins 101, carried by the ratchet wheel 36.

The operation of my novel splicing device will now be readily apparent and is as follows: The splicing thread is normally maintained within the stocking within the inside line of the needles, and when it is desired to reinforce any portion of the fabric, the splicing mechanism is actuated to bring the splicing thread into operative position with respect to the needles, such as is desirable when the heel or toe or the garter portion of the stocking is being knitted. When the parts are in such a relation to each other that the groove 51 in drum 37 causes the roller 52 and thereby the arm 53 to move rearwardly or toward the right to cause the cam face 56 to engage the roller 60 and thereby cause the block 59 to move upwardly. As the block 59 is moved upwardly owing to the manner in which the same is pivoted at 58, the rod 61 will be raised thereby causing the cam 68 to be maintained in raised position during the time that the roller 60 contacts with the upper face of the cam member 54. When the cam 68 is in raised and idle position, and the sinker head 12 is rotating, the roller 71 passes between the cam faces 69 and 70 with-

out contacting therewith, but when the cam 68 is moved from its idle or neutral position, the roller 71 co-acting with either of the reversely inclined faces 69 and 70 will cause the arm 73 to be rocked, thereby rocking the gear segment 78 and since the latter meshes with the pinion 79, the shaft 80 will be rocked, the result of which will be to cause the free end of the guide 84 to be raised or lowered in the manner before described and this without breaking the splice thread thereby reducing the liability of drop stitches or broken loops. It will be seen that when the splice thread is in its one position, the splice-thread carrying end of the guide 84 is located exteriorly of the needles, and when the guide is moved it is raised upwardly and over the circular line of the needles in a direct and positive manner so that there is no possibility of the guide 84 coming in contact with the needles and thus causing a breaking of the needles, as is liable to occur in prior devices of this character with which I am familiar. The operation just described refers to the manner in which the splicing thread is moved into and out of its operative position when the heel or toe of the stocking is being reinforced, and when the garter portion is being reinforced, I employ independent novel mechanism for controlling the reversing cam 68, which will now be described. When the garter portion of the stocking is being knitted, the drum 37 has been brought to such a position that the cam 92 thereon will engage one end of the lever 93 in such a manner that the same will be rocked on its fulcrum 94, thereby causing its end portion 96 to coact with the pin or lug 97 to raise the rod 61 and thereby the cam projection 68 so that during the interval of time in which the garter portion is being knit the cam 68 will be maintained in its raised position so that the roller 71 will co-act with the faces 69 and 70 respectively of cam 68 it being understood that the shaft 80 will be maintained in any position to which it is drawn owing to the friction of the spring 81 thereagainst.

Through the medium of the mechanism shown herein and conventional mechanism such as disclosed in the Franck patents *supra*, the sinker gear 11 and the drum 37 are actuated, during the working of the machine, in the ordinary well known manner.

Special attention is directed to the novel movement which is imparted to the splice thread guide, and so far as I am aware I am the first in the art to devise a construction wherein the operative end of the splice thread guide is moved upwardly and inwardly beyond the inside line of the needles and it is to be understood that my claims to such features are to be interpreted with corresponding scope.

It will now be apparent that I have devised a novel and useful splicing mechanism for knitting machines, which embodies the feature of advantage enumerated as desirable in the statement of invention and the above description, and while I have in the present instance illustrated and described a preferred embodiment thereof which has been found in practice to give satisfactory and reliable results, it is to be understood that the same is susceptible of modification in various particulars without departing from the spirit and scope of the invention or sacrificing any of its advantages.

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

1. In a splicing mechanism, a splice-threaded guide, and means for maintaining the splice-thread in operative position exterior of the needles and in a horizontal plane below the upper ends thereof and for moving the splice carrying portion of the guide upwardly above the needles and inwardly clear of the needles and beyond the inside line of the needles.

2. The combination of the needles, the sinker gear, the cam drum, a support on the sinker gear, a shaft journaled in said support and equipped with a splice thread guide and a pinion, yielding means for holding the shaft against casual rotation, an arm mounted to swing vertically on the support and having a lateral projection, a gear fixed with respect to said arm and intermeshed with the pinion, a vertically movable rod, arms thereon, a cam carried by said arms and having upper and lower faces adapted to be positioned above and below the above end below the path of the lateral projection of the arm on the sinker gear, a lever actuated by the cam drum for raising the vertically-movable rod, a vertically-swinging block for maintaining the rod in a raised position, a slidable cam for raising and supporting said block and an arm fixed to said slidable cam and actuated by the cam drum.

3. The combination of the needles, the sinker gear, the cam drum, a support on the sinker gear, a shaft journaled in said support and equipped with a splice thread guide and a pinion, yielding means for holding the shaft against casual rotation, an arm mounted to swing vertically on the support and having a lateral projection, a gear fixed with respect to said arm and intermeshed with the pinion, a vertically movable rod, a cam connected therewith and having upper and lower faces adapted to be positioned above and below the path of the lateral projection of the arm on the sinker gear, means actuated by the cam drum for raising the vertically-movable

rod, and means actuated by the cam drum for maintaining said rod in a raised position.

4. The combination of the needles, the 5
sinker gear, the cam drum, a support on the sinker gear, a shaft journaled in said support and equipped with a splice thread guide and a gear, yielding means for holding the shaft against casual rotation, an 10
arm mounted to swing vertically on the support and having a lateral projection, a gear fixed with respect to said arm and intermeshed with the gear on the shaft, a vertically movable cam having upper and 15
lower faces adapted to be positioned above and below the path of the lateral projection of the arm on the sinker gear, means actuated by the cam drum for raising said cam, and means actuated by the cam drum for 20
maintaining the cam in a raised position.

5. The combination of the needles, the sinker gear, a support on the sinker gear, a shaft journaled in said support and equipped with a splice thread guide and a 25
gear, yielding means for holding the shaft against casual rotation, an arm mounted to swing vertically on the support and having a lateral projection, a gear fixed with respect to said arm and intermeshed with 30
the gear on the shaft, a vertically movable cam adapted to be positioned in the path of said lateral projection and to engage the same, means for raising said cam, and means for retaining said cam in a raised 35
position.

6. The combination of the needles, the sinker gear, the cam drum, a movable splice thread guide mounted on and carried by the sinker gear, and a cam actuated 40
from the cam drum for moving the splice thread guide incidental to movement of the sinker gear.

7. The combination of the needles, the sinker gear, a vertically swinging splice 45
thread guide mounted on and carried by

the sinker gear, a movable cam for swinging the splice thread guide incidental to movement of the sinker gear, and means for positioning said cam.

8. The combination of the needles, the 50
sinker gear, a vertically swinging splice thread guide mounted on and carried by the sinker gear, a vertically-movable cam having upper and lower faces for swinging the splice thread guide incidental to move- 55
ment of the sinker gear, and means for positioning said cam.

9. The combination of the needles, the sinker gear, the cam drum, a vertically-movable splice thread guide mounted on the sinker gear, a gear fixed with respect to said guide, a gear also mounted on the sinker gear and intermeshed with the gear of the guide and having an arm, a vertically-movable cam having spaced faces for 65
engaging the arm on the sinker gear, and means actuated from the cam drum for positioning the cam with the spaced faces.

10. The combination of the needles, the sinker gear, a vertically swinging splice 70
thread guide mounted on the sinker gear, a gear fixed with respect to said guide, a gear also mounted on the sinker gear and intermeshed with the gear of the guide and having an arm, and means for engaging 75
said arm and actuating the splice thread guide incidental to movement of the sinker gear.

11. The combination of the needles, the sinker gear, a movable splice thread guide 80
thereon, a cam drum, a movable cam having spaced faces for actuating the guide incidental to movement of the sinker gear, and means actuated by the cam drum for positioning the said cam.

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Witnesses:

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