Jan. 15, 1952 E. ST. PIERRE 2,582,465

SINKER CAP AND OPERATING MECHANISM

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FIG. 1.

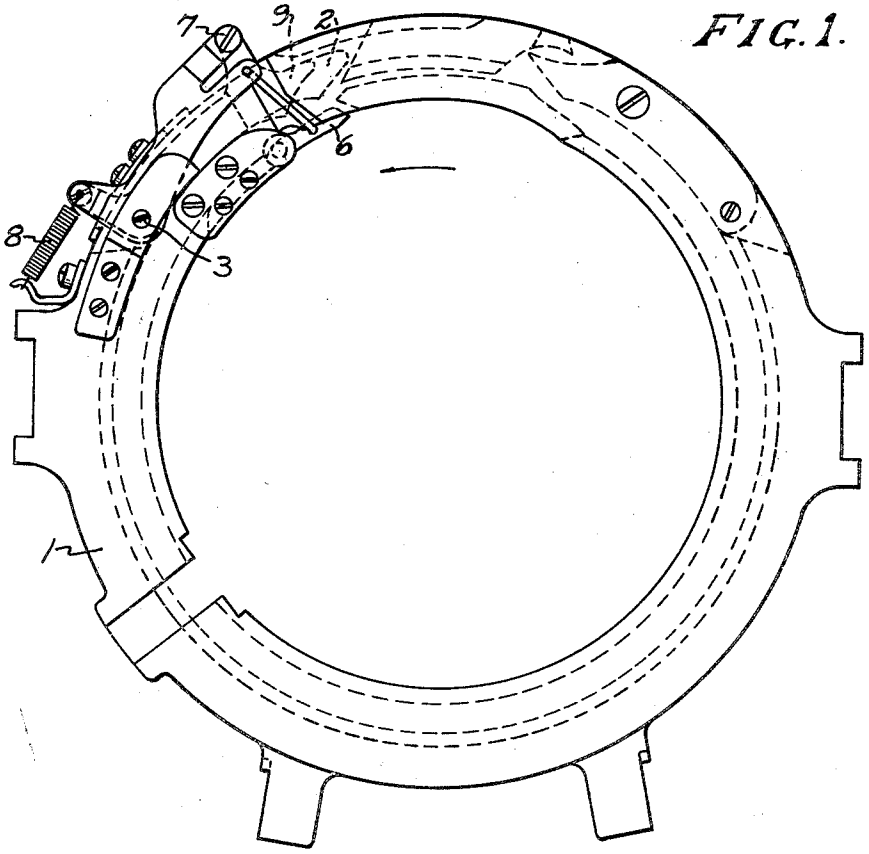


FIG. 2.

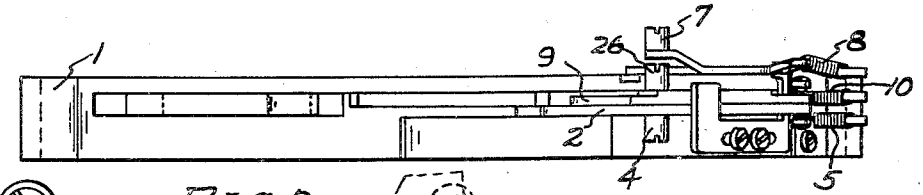
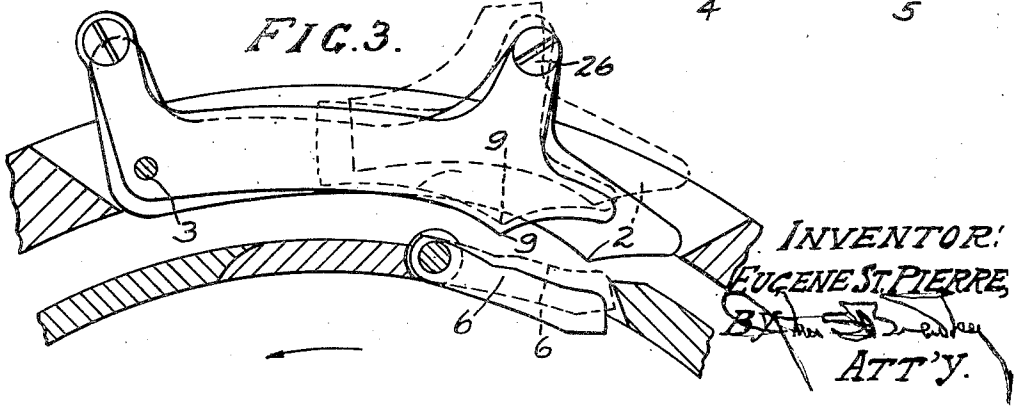


FIG. 3.



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FIG. 4.

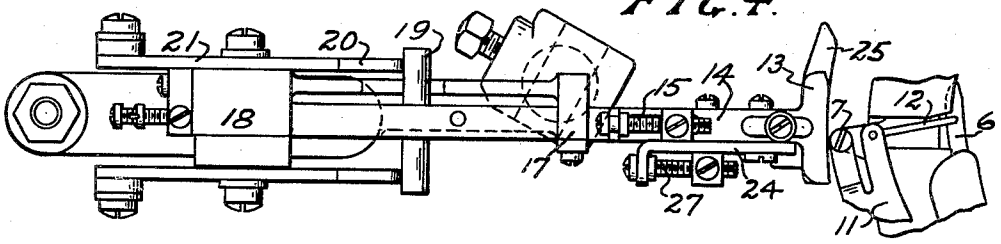


FIG. 5.

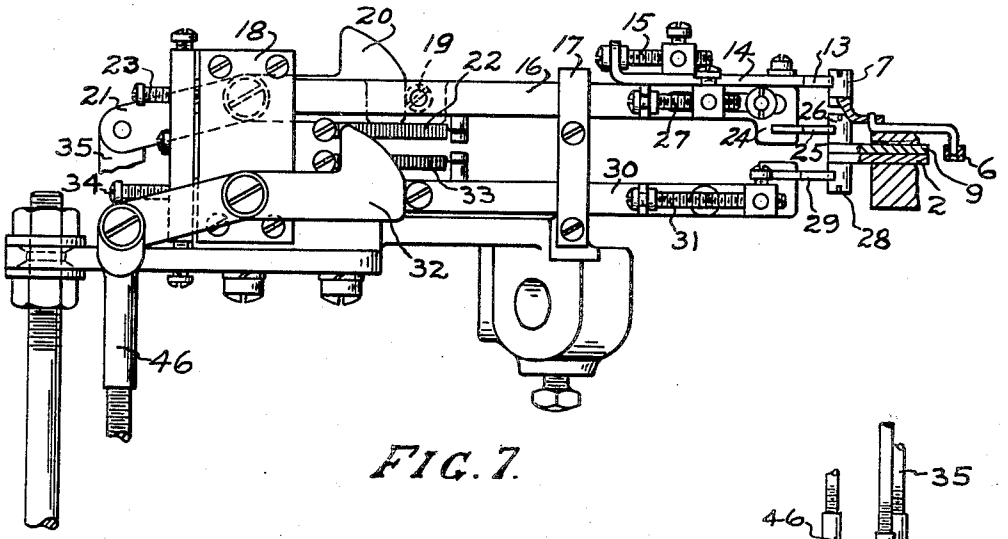


FIG. 7.

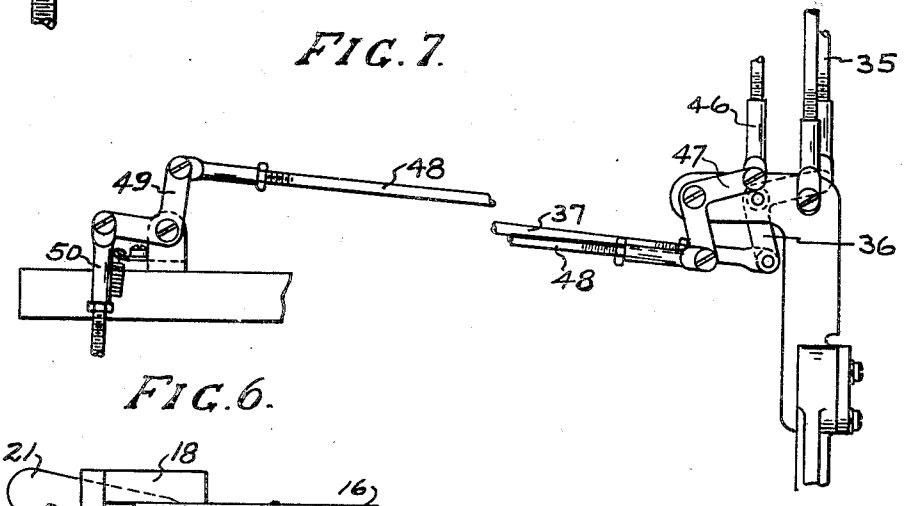
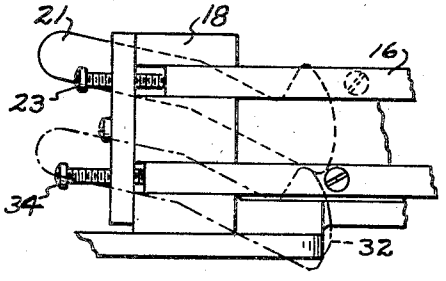


FIG. 6.



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FIG. 8.

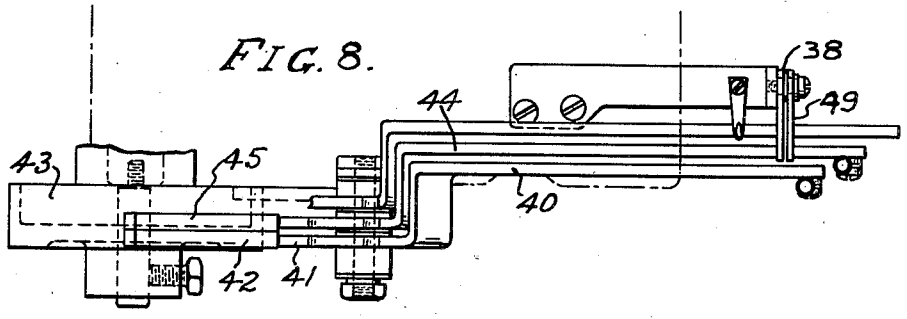
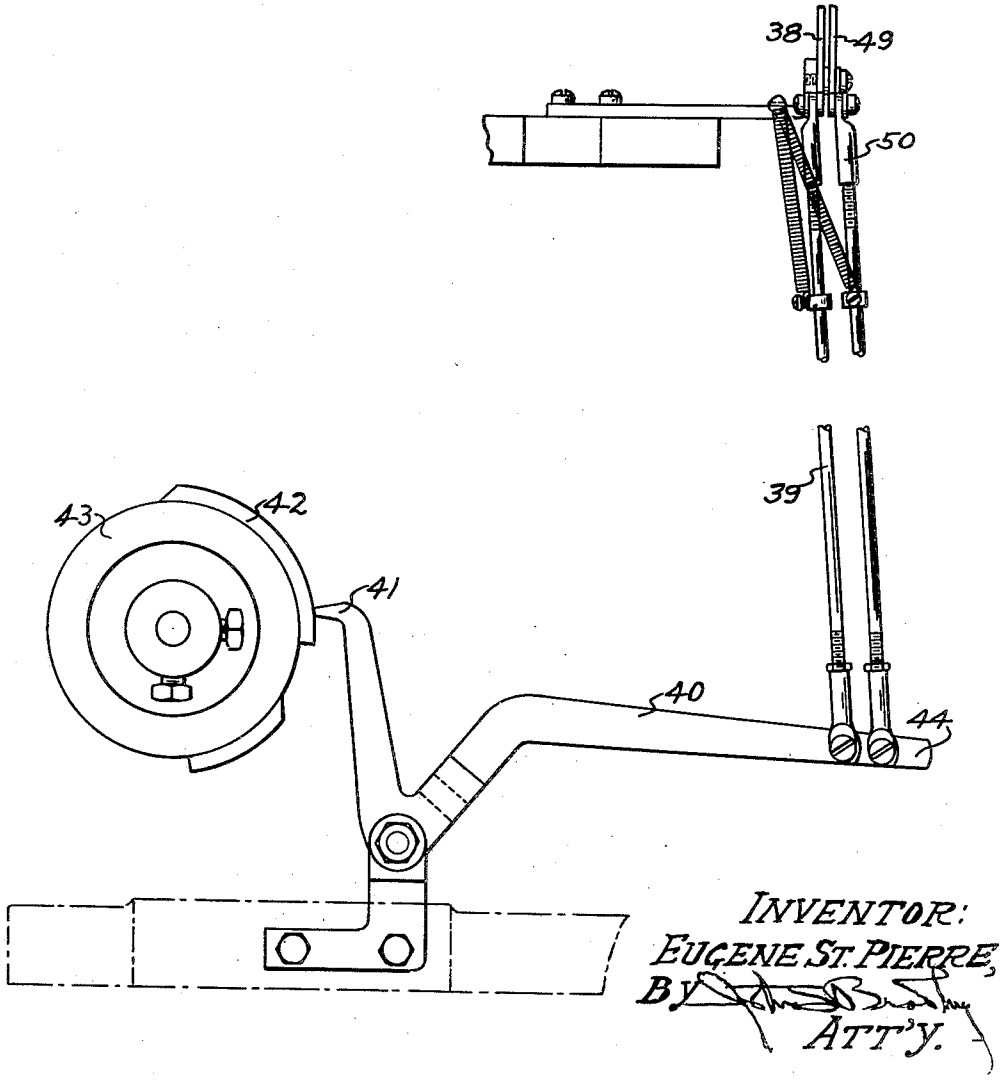


FIG. 9.



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UNITED STATES PATENT OFFICE

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SINKER CAP AND OPERATING MECHANISM

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Application July 8, 1949, Serial No. 103,551

3 Claims. (Cl. 66—108)

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This invention relates to a new and useful improvement in sinker caps for circular, independent needle, knitting machines and, in particular, to the type of cap in which one or more of the cams is of the pivoted or flopper type. The invention is also concerned with means for operating the flopper cam or cams.

Patent #2,374,857 is illustrative of a method of knitting which may be used, generally in combination with the usual method of knitting, to produce hosiery of superior quality. The use of the method of the patent involves an alteration in the normal sinker cams so that the sinkers may be moved in sooner than usual and far enough so that yarn will be drawn over their backs instead of in their throats. The usual method of knitting in which yarn is drawn in the throats of sinkers involves only the usual sinker cam arrangement. Since as a rule the two methods of knitting are combined in the production of hosiery, the usual method being used in the heel and toe, provision is made for operating the sinkers in two different ways. This may be accomplished by adding to the usual sinker cam arrangement a pivoted or flopper cam which can be moved into action when knitting by the method of the patent to supplant the usual cam and to cause the sinkers to move in sooner and further than usual so that the yarn will be drawn over their backs instead of in their throats when knitting the leg and instep for example. When knitting the heel and toe by the usual method, this cam may be moved out of action so that the usual sinker cams are free to function in the usual way.

Broadly stated, this is the only change required for knitting in relatively coarse gauges such as found, for example, in men's hosiery. For finer gauges and, in particular, the very fine gauges characteristic of ladies' hosiery modification of the casting off cam is desirable. Obviously, when the sinkers are so positioned that yarn is drawn over their backs, they should also be moved in further than usual to cast off the stitches. In relatively coarse gauge knitting, the yarns are relatively heavy and the loops relatively large. Consequently, a single fixed casting off cam suitable for carrying out the patented method of knitting may be employed for the usual method as well since the strength and stretch of the loops are ample to permit casting off by the same cam when knitting by the usual method.

However, when fine yarn and fine gauge knitting is involved, the yarn is relatively weak and

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the loops extremely small so that more delicate handling is desirable. For this reason, the fixed casting off cam referred to above may be supplanted by a pivoted casting off cam combined with suitable operating mechanism for moving it in to the correct depth for casting off when knitting by the patented method and for retracting it to the depth adequate for casting off when knitting by the usual method.

While this is the primary field for which this invention was made, it will be realized that it is not limited thereto and may be used in any situation where a similar control of sinkers is essential or desired. One type of the invention is shown in the drawing for purposes of illustration and description herein.

In the drawing:

Fig. 1 is a plan view of a sinker cap;

Fig. 2 is an illustration of the same cap;

Fig. 3 is a view partly in section of a fragment of the cap showing particularly the pivoted or flopper type of cams;

Figs. 4 and 5 are, respectively, plan and illustrational views of a type of mechanism for operating the flopper cams of Figs. 1–3;

Fig. 6 is a detail view of a part of the mechanism of Figs. 4 and 5 for descriptive purposes; and

Figs. 7, 8 and 9 are views of the operating connection by which the mechanisms of Figs. 4 and 5 are energized.

The sinker cap 1 shown in Figs. 1 and 2 is provided with a flopper cam 2 pivoted at 3 and so positioned and proportioned that it will cause sinkers to be moved inwardly soon enough and far enough to permit the yarn to be drawn over their backs behind their nibs as required in the method of knitting described and claimed in the patent already referred to. Flopper cam 2 is provided with a stud 4 (Fig. 2) by means of which it can be moved inwardly the desired distance by suitable operating mechanism, which will be described, against the tension of a spring 5. Another pivoted cam 6 is provided having a stud 7 by which it is so operated against the tension of spring 8 that the space between it and cam 2 is always adequate for the passage of sinker butts. In other words, cam 6 swings in and out concurrently with cam 2 and limits the inward movement of sinkers to the distance determined by the position of cam 2.

The casting off cam 9 is also a pivoted cam and is, of course, movable inwardly against the tension of spring 10 to the distance required for properly casting off the stitches drawn with the

aid of cam 2. Cam 6 is directly associated, in the operative sense, with casting off cam 9 and is moved in a corresponding manner so that a channel for the sinker butts is always provided between cams 6 and 9.

Even when knitting hosiery by the method already referred to it is customary to knit the heel and toe and also the sole if a split foot is being made, in the usual manner in which the yarns are drawn in the throats of the sinkers. At such times, cam 2 is unnecessary and is withdrawn into the inoperative position indicated in broken line in Fig. 3 and casting off cam 9 is also drawn back slightly to the correct casting off depth for this type of knitting. This is also shown in broken line in Fig. 3. At the same time, cam 6 is swung into the broken line position shown in Fig. 3 so that the relation between cams 9 and 6 is maintained for the same reason. When knitting in relatively coarse gauges it is possible to utilize a conventional fixed casting off cam for conventional knitting and also when knitting by the patented method referred to. For fine gauges the pivoted casting off cam described above is to be preferred since it may be adjusted independently for each of its two operating positions. In addition, firing or other undesired displacement of sinkers is prevented by the associated cam 6.

A form of mechanism by which these cams may be operated is shown in Figs. 4–9. Cam 6 is connected to a pivoted lever 11 carrying the stud 7 by a link 12 so that any movement of lever 11 will be transmitted directly to cam 6. Engageable with stud 7 is an operating head 13 on a bracket 14 which is longitudinally adjustable as shown at 15. Bracket 14 is mounted upon a slide 16 which is longitudinally slidable in guides 17 and 18. Slide 16 is provided with a stud 19 which is engagable with the cam-shaped head 20 of a lever 21 pivoted on guide 18. When lever 21 is in the position shown in Figs. 4 and 5, slide 16 will be extended and cam 6 will be swung inwardly with respect to the cylinder to the position determined by adjustment 15. On the other hand, if lever 21 is caused to assume the position shown in Fig. 6, slide 16 will be released and will move to its retracted position as shown under the urge of spring 22. The extent of this retraction may be adjustably determined by a screw 23 engageable with the end of slide 16.

Also mounted upon slide 16 by a bracket 24 is a similar head 25 which is engageable with a stud 26 projecting from casting off cam 9. Bracket 24 is also adjustable as indicated at 27 so that the position of head 25 with respect to stud 26 can be varied. Therefore, as in the case of cam 6, casting off cam 9 can be moved simultaneously in to any desired position determined by adjustment 27 and out to the position determined by screw 23. Therefore, both cams 6 and 9 are independently adjustable and are movable in harmony between the two operating positions of cam 9 to provide a suitable and consistent track for the sinker butts.

Similarly, cam 2 is provided with a stud 28 which is engageable by a head 29 adjustably mounted on a slide 30 by means of adjustment 31. Slide 30 is essentially like slide 16 and has similar movements imparted to it by similar mechanism. It is projected towards the cylinder by pivoted

cam lever 32 in order to move cam 2 into the full-line position shown in Fig. 3 and when released by lever 32, as shown in Fig. 6, it is retracted by spring 33, the distance permitted by screw 34. The operating mechanism thus far described is, of course, mounted on any convenient rigid part of the machine.

Cam lever 21 is moved between the position shown in Fig. 5 and that shown in Fig. 6 by any suitable means. That illustrated by the drawings consists of a rod 35 pivoted to cam lever 21 and connected at its other end to the bell crank 36 (Fig. 7) which in turn is connected to another rod 37. This rod connects with another bell crank 38 which connects with a rod 39 which is pivotally connected adjacent one end of a rocker 40, the other end 41 of which is engageable with a cam or cams 42 on drum 43 operable in the usual intermittent manner unnecessary to describe. The timing of the operation of this drum will, of course, be suited to the timing of the operation of the pivoted cams.

A similar linkage connects cam lever 32 with a rocker 44 (Fig. 8) which is operated by a cam or cams 45 on drum 43. This linkage, as shown, consists of a rod 46, bell crank 47, rod 48, bell crank 49 and rod 50.

I claim:

1. For a circular, independent needle, knitting machine, a sinker cap including a pivoted casting off cam positionable at a plurality of casting off positions, automatic means for positioning said cam at either of said positions, and adjusting means for altering the location of each of said positions independently of the other.

2. For an independent needle, knitting machine having sinkers, a sinker cap having a pivoted casting off cam and a second pivoted cam spaced inwardly from said casting off cam, automatic means for swinging both of said cams simultaneously so as to maintain a desired space between them for the passage of sinker butts and means for altering the width of said space.

3. For a circular, independent needle, knitting machine a sinker cap provided with a pivoted casting off cam, means for automatically swinging said cam inwardly of said cap, an adjustment on said automatic means for controlling the extent of inward swing of said cam and an adjustment on said automatic means for limiting the extent of outward swing of said cam.

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