Dec. 24, 1935. V. LOMBARDI 2,025,466

KNITTING MECHANISM

Filed Feb. 26, 1935

Fig.1

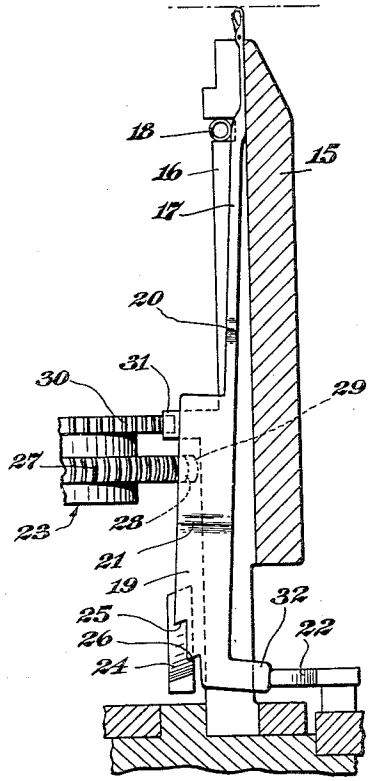


Fig.2

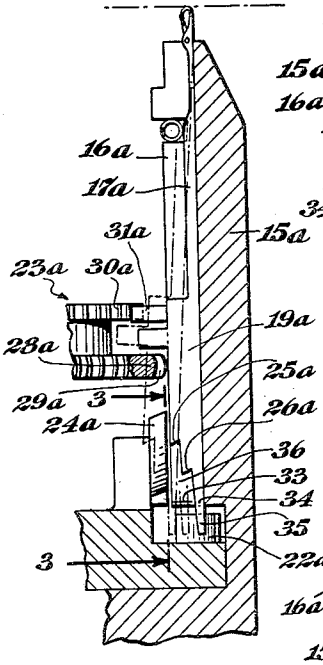


Fig.3

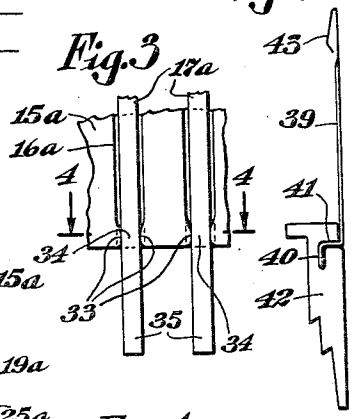


Fig.4

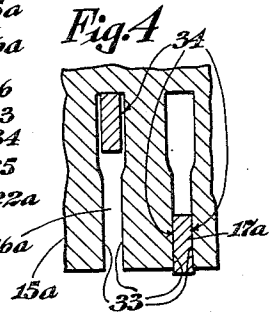


Fig.5

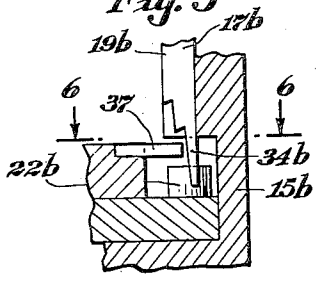


Fig.6

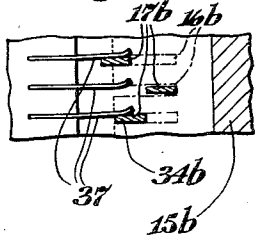


Fig.7

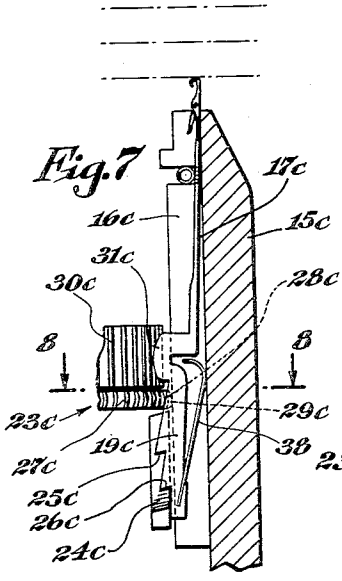
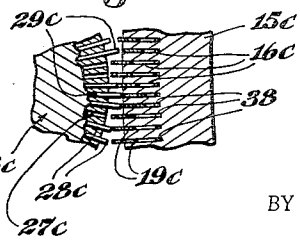


Fig.8



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UNITED STATES PATENT OFFICE

2,025,466

KNITTING MECHANISM

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Application February 26, 1935, Serial No. 8,256

4 Claims. (Cl. 66—123)

This invention relates to knitting mechanism; the present application being a continuation in part of my copending application Serial No. 720,921, filed April 17, 1934.

Among the objects of the invention are the provision for use in a knitting machine of a unitary member which comprises both a knitting element portion and a selective element portion.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the constructions hereinafter set forth and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawing, in which:

Figure 1 is a vertical sectional view of a portion of a knitting machine showing a knitting element in the form of a needle embodying the invention;

Fig. 2 is a similar view illustrating a modification;

Fig. 3 is an enlarged section on the line 3—3 of Fig. 2;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is a fragmentary view similar to Fig. 2 showing a modified arrangement;

Fig. 6 is an enlarged section on the line 6—6 of Fig. 5;

Fig. 7 is a view similar to Fig. 1 showing another modification;

Fig. 8 is a section on the line 8—8 of Fig. 7;

Fig. 9 is a view of a modified form of needle.

In my co-pending application Serial No. 720,921 above referred to, there are disclosed knitting machines embodying selective elements individual to each of a series of knitting elements mounted for sliding movement on a bed and arranged to be selectively set in a multiplicity of different positions and to be selectively actuated in accordance with the settings thereof. The present invention is primarily directed to constructions wherein the knitting element and the selective element are part of a unitary knitting member, and are not independent elements either attached or unattached. In certain aspects the invention constitutes an improvement over certain of the forms of construction particularly exemplified in my co-pending application, Serial No. 680,168, filed July 13, 1933.

The knitting-element portion may be a latch needle portion, a beard needle portion, or a yarn manipulating element of other desired type; the various members utilized may be of any of the types illustrated in my said co-pending application, Serial No. 720,921, or of other suitable type as will be apparent to those skilled in the art; the knitting bed may be stationary or movable, and may be of any desired form or shape; and other modifications of a wide variety of types may be made.

In Fig. 1 there is shown a needle bed 15, which may be of the cylindrical type, and which is formed with slots 16 about its periphery. In these slots is a series of needles 17 which in the present instance are of the latch type and which are held in the slots by an annular spring 18. The lower portions 19 of the needles are arranged for swinging on an axis adjacent to the spring 18 to permit the same to be set in a multiplicity of positions lateral of the slots. Each needle is formed with transverse bends 20 and 21 whereby the selective portions 19 will be frictionally retained in the positions in which they are set. There is provided also actuator mechanism which revolves about the cylinder when the same is stationary, or which may be stationary if the cylinder rotates. This mechanism includes an aligning cam 22, a pattern wheel 23, and an advancing cam 24, which in the present instance act in sequence. Each needle is formed with a plurality of shoulders, as indicated at 25 and 26, which are designed to engage the cam 24 when the portion 19 is in an outward or an intermediate position respectively, but not when it is in an inward position. As will be noted, these shoulders slope outwardly, and the upper surface of the cam 24 slopes in a similar direction, so as to prevent inward movement of the portion 19 when the shoulders are engaged by the cam. The pattern wheel is formed to provide a multiplicity of setting configurations, which in the present instance comprise slots 27, certain of which are empty, certain of which contain short actuators 28, and others of which contain long actuators 29, in the manner illustrated more in detail in Fig. 8. The pattern wheel is formed with a gear 30 meshing with teeth 31 on the bed 15, so as to be rotated during the relative movement of the bed and the actuator mechanism.

In operation, all of the portions 19 are moved outwardly by the cam 22 bearing against an inward projection 32 on the needle, and certain of the needles are thereupon pushed part way in by the short actuators on the pattern wheel,

and others are pushed in all the way by the long actuators on the pattern wheel. Thereafter, the cam **24** advances to the upper line at the top of Fig. 1 those needles which were passed by the pattern wheel advances to the middle line at the top of the figure those needles which were operated by the short actuators so that the same will be in a position for tucking, interlocking or the like design operations; and passes those needles which were operated upon by the long actuators so that these needles will not receive yarn from a yarn carrier forming a part of the actuator mechanism.

In Figs. 2–4 the parts are generally similar to the parts shown in Fig. 1 and are designated by similar reference numerals with the addition of the subscript *a*. The slots **16***a* are narrowed at their outer portion as indicated at **33** just above the plane of action of cam **22***a* so as to bear frictionally against a part **34** of the sleeve portion **19***a* of the needle when the latter is in an outward or an intermediate position, but not when it is in an inward position. Accordingly, the portion **19***a* will be frictionally retained in an outward position until the cam **24***a* has engaged either the shoulder **25***a* or **26***a*, but will not be frictionally retarded in its movement after it has been restored or has restored itself to its normal inward position. In the present instance, the extension **32** is omitted and the cam **22***a* acts directly on the thin lower end **35** of the needle **17***a*; an outwardly extending slot portion **36** being provided.

A similar arrangement is shown in Figs. 5 and 6 wherein there are shown similar parts designated by similar reference numerals, except that they are followed by the subscript *b*. In this arrangement there are provided springs **37** which extend inwardly toward the portions **34***b* on the needles so that when these portions are moved outwardly the springs will bear against them to frictionally retain them in position to be engaged by the cam.

In instances such as those wherein the use of a cam **22** is undesirable, wherein the use of frictional retaining means of any sort is not desired, or wherein a normally outward needle is to be used, there may be utilized an arrangement such as shown in Figs. 7 and 8 wherein the needles are at all times held in an outwardly swung position except when they are being acted upon by the pattern wheel or when they are engaged by or inside of the cam. The cam, in this instance, is disposed beneath the pattern wheel so that it will engage the needles while the pattern wheel is acting thereon. In these figures the general construction is similar to that of Figs. 1 and 2, the parts being indicated by similar reference numerals with the subscript *c*. Each needle **17***c* is held in an outward position at all times by a spring **38** except when an actuator on the pattern wheel **23***c* is in engagement therewith. The cam **24***c* is directly below the pattern wheel so that it will engage the shoulder **26***c* when the pattern wheel has no actuator in its slot. When the pattern wheel has a short shoulder **28***c* in a slot the needle will be pushed part way in and the shoulder **25***c* engaged by the cam. When the pattern wheel has a long actuator **29***c* in its slot the needle will be pressed all the way in so that both shoulders will ride to the rear of the cam. After the cam has once engaged a particular shoulder it will continue such engagement until the positioning of the needle is completed. It will thus be seen that no setting cam is required nor is any frictional retaining means necessary. Fig. 7 also illustrates how the gear **30***c* of the pattern wheel may mesh with projections **31***c* on the needles, if desired.

It will be apparent that the needles or other knitting elements, though unitary, need not be integral. By a "unitary" member is meant a member wherein there is no relative movement between the portions. In Fig. 9, for example, there is illustrated a needle comprising an upper independent portion **39** having a bent end **40** fitting within a slot **41** in a lower portion **42**. Except for this feature the body of the needle is the same as that shown in Fig. 1 and is operated in the same way. In order to exemplify a beard needle, however, the needle is shown with a beard **43** rather than with a latch. Reference is made to my co-pending application, Serial No. 42,368, filed September 27, 1935, which is a division of the present case.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A unitary member adapted to be mounted for longitudinal sliding movement on a portion of a knitting machine and having a knitting element portion and a portion adapted to be swung between a multiplicity of lateral positions and formed to provide along its length a plurality of cam-engaging surfaces each adapted when the member is in one of said positions to be intercepted by a single cam surface, said cam-engaging surfaces being so disposed on said member that the cam surface will impart to the member longitudinal sliding movement of different extents in one direction depending on which of the cam-engaging surfaces is intercepted by the cam surface, the axis of swinging movement being beyond said cam-engaging surfaces in said direction.

2. A unitary member adapted for longitudinal sliding movement in a portion of a knitting machine and formed to provide a yarn-manipulating portion adjacent one end and a portion carrying a plurality of cam-engaging surfaces adjacent to the other end, the second mentioned portion being adapted to be moved laterally and said cam-engaging surfaces being adapted for selective engagement with a single cam surface dependent upon the lateral position which said second mentioned portion is in.

3. A unitary member adapted to be mounted for longitudinal sliding movement on a portion of a knitting machine and having a knitting element portion and a portion adapted to be swung between a multiplicity of lateral positions and formed to provide along its length a plurality of cam-engaging surfaces each adapted when the member is in one of said positions to be intercepted by a single cam surface, said cam-engaging surfaces being so disposed on said member that the cam surface will impart to the member longitudinal sliding movement of different extents in one direction depending on which of the cam-engaging surfaces is intercepted by the cam surface, and said cam-engaging surfaces being so disposed that all of them may be moved out of the path of such cam surface by a complete

swinging movement of the second mentioned portion of the member.

4. A unitary member adapted to be mounted for longitudinal sliding movement on a portion of a knitting machine and having a knitting element portion and a portion adapted to be swung between a multiplicity of lateral positions and formed to provide along its length a plurality of cam-engaging surfaces each adapted when the member is in one of said positions to be intercepted by a single cam surface, said cam-engaging surfaces being so disposed on said member that the cam surface will impart to the member longitudinal sliding movement of different extents in one direction depending on which of the cam-engaging surfaces is intercepted by the cam surface, each of said cam-engaging surfaces being formed to prevent lateral movement of the second mentioned portion of the member when such cam-engaging surface is engaged by the cam surface.

VINCENT LOMBARDI.