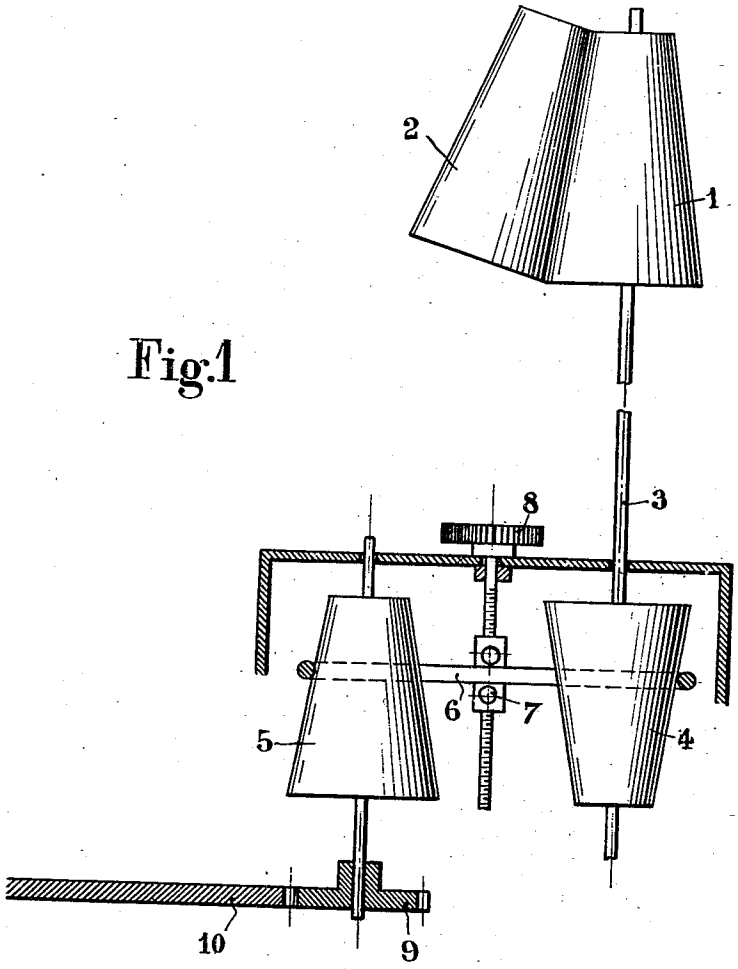
Dec. 5, 1939. G. LEBOCEY 2,182,295

AUTOMATIC VARIABLE OUTPUT FEEDER FOR SHAPED KNITTED ARTICLES

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Fig.1



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Fig.2.

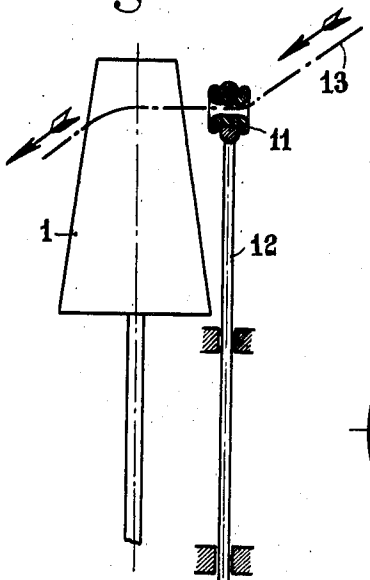


Fig.4.

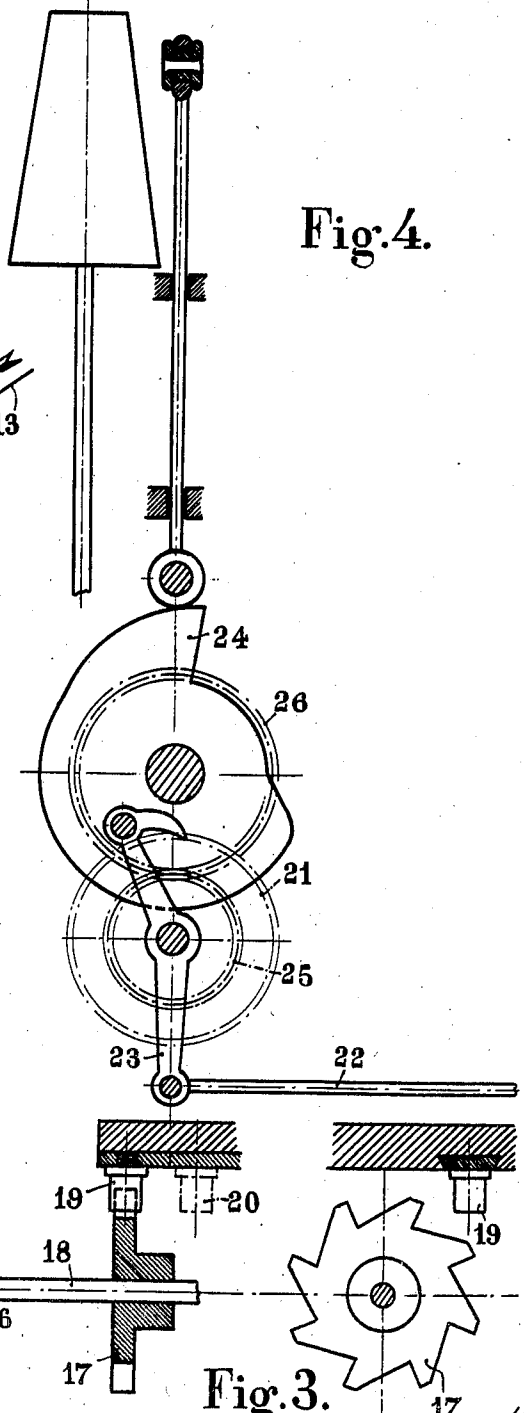


Fig.3.

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AUTOMATIC VARIABLE OUTPUT FEEDER FOR SHAPED KNITTED ARTICLES

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Application November 16, 1936, Serial No. 111,138
In France November 20, 1935

2 Claims. (Cl. 66—132)

This invention is applicable to circular or flat knitting machines for the manufacture of shaped articles in ribbed or plain stitch, and more particularly to machines for the manufacture of elastic knitted articles, such as: sheath-corsets, belts, corsets, stocking for varicose veins, bathing costumes, in which the shape particularly depends on the more or less important tension exerted on the stitches by one or more elastic threads incorporated upon knitting.

The invention relates to a new yarn feeder automatically controlled so as to ensure the supply of one or more yarns under a variable output or tension.

The device according to the invention is characterised by the following features taken separately or in combination:

(*a*) A system of feeding pinions, of frustum shape, receiving a predetermined angular speed according to the speed of the machine and to the size of the knitted articles.

(*b*) A system for guiding the yarn, arranged and automatically controlled for travelling, according to any predetermined law, over the entire surface or a portion of the feeding cones, in order to ensure at any moment a suitable yarn supply.

(*c*) An automatic device for controlling the yarn guides, actuated either by a circular cam, linear cam, link chain, drum provided with driving cams, stepped cam, or by any mechanical equivalent capable of controlling, by means of a set of suitable levers, the successive positions of the yarn guide along the feeding cones.

(*d*) In a preferred form of construction, a suitable arrangement of the guide system ensuring at the desired moment the instantaneous return of the yarn-guide to its initial starting position. This arrangement has the important advantage of allowing the continuus manufacture of knitted articles all of which have the same setting for the same direction of formation of the stitches, whereas in all systems known up to this day, two successive articles must be either knitted "top to bottom" or separated by a connection zone.

(*e*) A change speed gear, known per se, capable of being controlled either by hand, or automatically, if need be, for allowing to instantaneously adjust the angular speed of the feeding cones without affecting the law of displacement of the yarn-guides.

The following description and the accompanying drawings illustrate, by way of example, a form of construction of the device according to the invention, applied to a circular knitting machine of standard design.

Fig. 1 is a partial elevation of a feeding drum and of its actuating device.

Fig. 2 is another partial elevation showing a yarn-guide movable along the feeding drum and the device controlling this yarn-guide.

Fig. 3 is a partial section of a detail arrangement.

Fig. 4 shows a modification of the feeder.

Fig. 1 is a diagrammatic elevation showing the device for driving a pair of feeding members of frustum shape through the medium of a change speed gear comprising conical drums. In this figure, 1 designates the feeding cone rigid with the driving spindle 3. The cone 2, loosely mounted in its spindle, is held in contact with cone 1 by simple pressure, so as to ensure the supply of yarn without possibility of slipping. The surface of the cones 1 and 2 can be striated, fluted, milled or simply covered with a lining sufficiently adherent for ensuring the forward movement of the yarn.

The frustum-shaped pulleys 4 and 5 of the change speed gear are connected by an endless belt 6. A guide fork member 7, which can be moved by a screw 8 provided with a milled knob or wheel, allows of regulating or correcting the angular speed of the feeding cones.

The actuation of the system is ensured by a pinion 9 meshing with a crown wheel 10 rigid with the rotating unit of the machine.

Fig. 2 is a diagrammatic side view showing the automatic control of the yarn-guide.

The yarn-guide eye 11 carried by a sliding rod 12 guides the yarn 13 opposite the feeding and driving cones 1 and 2.

The upward movement of the sliding rod 12 is controlled by a scroll cam 14, the profile of which varies according to the shape of the article desired.

According to the form of construction shown by way of example in Fig. 2, the rotation of the cam 14 is ensured by a worm and worm wheel device 15 and 16. A star ratchet wheel 17, rigidly secured on the shaft 18 of the worm, receives an intermittent motion of rotation under the impulse of a sliding tappet 19 carried by a ring rotatably mounted on the machine frame.

A switching counter of standard type (not shown) is provided for putting the sliding tappet 19 out of action in position 20. It will be easily understood that it is then possible to temporarily annul the rotation of the cam for obtaining during this period of time a constant output of the

yarn by simple stabilisation of the yarn-guide, and this independently of the profile of the cam.

On the other hand, it will be noted that the downward movement of the yarn-guide slide-block, according to the profile *a b* of cam 14, allows of obtaining the instantaneous return of the yarn guide to its initial starting position.

Fig. 3 is a partial view showing the actuation of the star wheel 17 by the tappet 19.

Fig. 4 is a side view showing another form of construction of the device controlling the yarn-guide. A ratchet wheel 21, actuated by a link and crank device 22 and 23, ensures the rotation of a cam 24, through the medium of a set of gears 25 and 26.

It is to be understood that the invention is not limited to the various forms of construction described by way of examples only. It will be easily seen that the use of a scroll cam constitutes a simple and practical means allowing to ensure with the greatest accuracy the control of the yarn-guide and the instantaneous return of the latter to its initial starting position, but that use might be made for that purpose either of a link chain, or of a drum provided with driving cams or of a screw actuated by a ratchet, or again of any mechanical equivalent capable of controlling the yarn-guide according to a given law.

Concerning the change speed gear, the latter can be constituted by stepped pulleys, friction plates, gears, etc., without departing from the scope of the invention.

Moreover, if the invention is more particularly applicable to the control of an elastic yarn, whether it is used as a warp thread, a weft thread, or as a looped thread, it is also applicable to the control of the output of a yarn in combination or not with an automatic device for controlling sinker cams for manufacturing shaped articles obtained by simple variation of the length of the stitches.

When the elastic yarn is "woven", that is to say inserted, or more exactly "confined" between the front stitches and the rear stitches of an article in ribbed fabric, certain designs can be obtained as follows:

Some needles are selected by a Jacquard device so as to pass from the non-knitting position either to the "loaded needle" position, or to the "pressed needle" position. The needles thus selected take the ground thread at the loop device, whereas the nonlifted needles do not take this thread. This results in a modification in the texture of the ground fabric which allows the elastic "woven" thread to appear at some places only, this being used for the formation of the designs.

This known method has been carried out up to now by the use of small striated or like pattern wheels, ensuring the upward movement of the selected needles.

Now it is possible to effect the Jacquard selection on a larger scale by means of a Jacquard film device. This apparatus comprising the "scroll" winding device, allows of obtaining shaped articles made of elastic fabric, such as sheath-corsets, belts, corsets, of a new style owing to the great variety of the patterns or designs obtainable.

On the other hand, it is also possible to manufacture shaped fabrics by insertion of an elastic yarn but with Jacquard fancy patterns in several colours, which are obtained by causing stitches of different colours to appear on the ground fabric. The selection of the needles will be controlled by means of the film apparatus. The articles thus obtained differentiate only from the ordinary Jacquard articles by the insertion of an elastic yarn fed with variable output or tension so as to automatically ensure their shaped nature.

I claim:

1. In a yarn-feeder for knitting machines, the combination of rotating conical drums pressed the one against the other and driven at a definite rate by the mechanism of said knitting machines, the yarn being so disposed as to pass between said drums and as to be driven by the latter, and a yarn guide arranged for introducing the yarn between said drums at a determined point, said yarn guide being secured to a vertical rod adapted to slide freely in a guide and to bear freely on a cam with its end which is opposite said yarn guide.

2. A yarn feeder as claimed in claim 1, in which said yarn guide which is secured to a rod, is adapted to slide freely in a vertical guide and to bear freely with its end which is opposite said yarn guide on the periphery of a rotary cam of which the end of the contour is connected to the beginning of said contour by a radial portion adapted to cause the free drop of said yarn guide and the return thereof to the starting position.

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