

(No Model.)

E. TIFFANY & G. E. PARKER.
QUARTER SAVER FOR FLAT RIB KNITTING MACHINES.

No. 521,191.

Patented June 12, 1894.

FIG. 1.

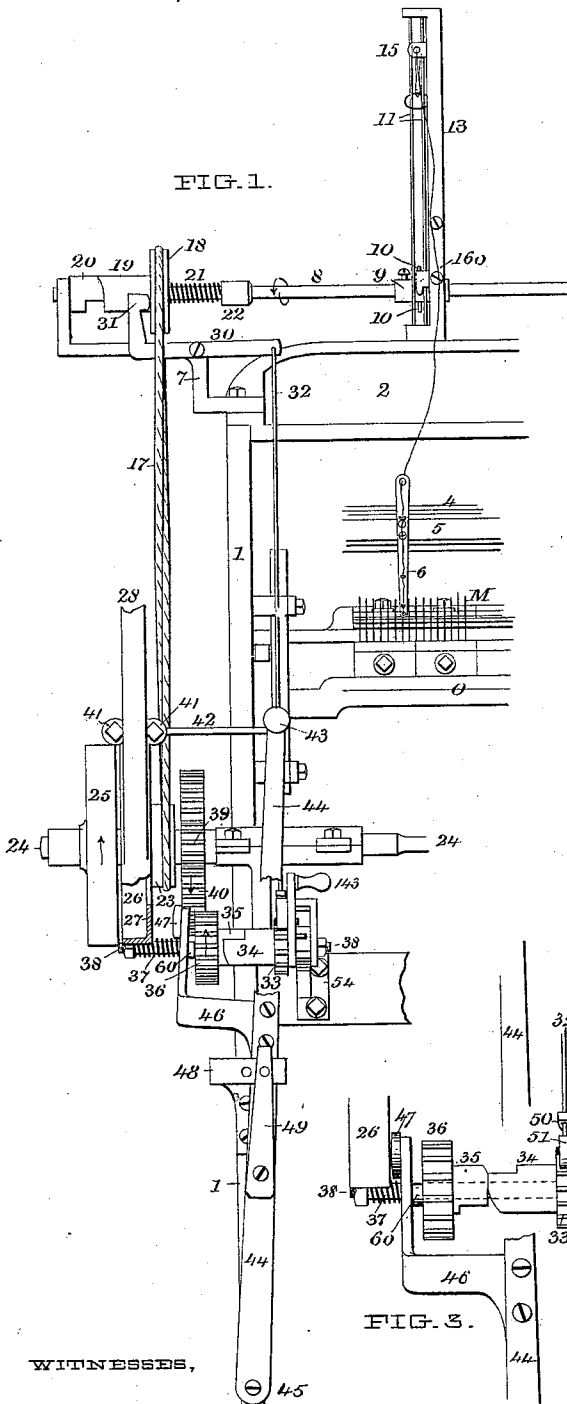


FIG. 3.

FIG. 2.

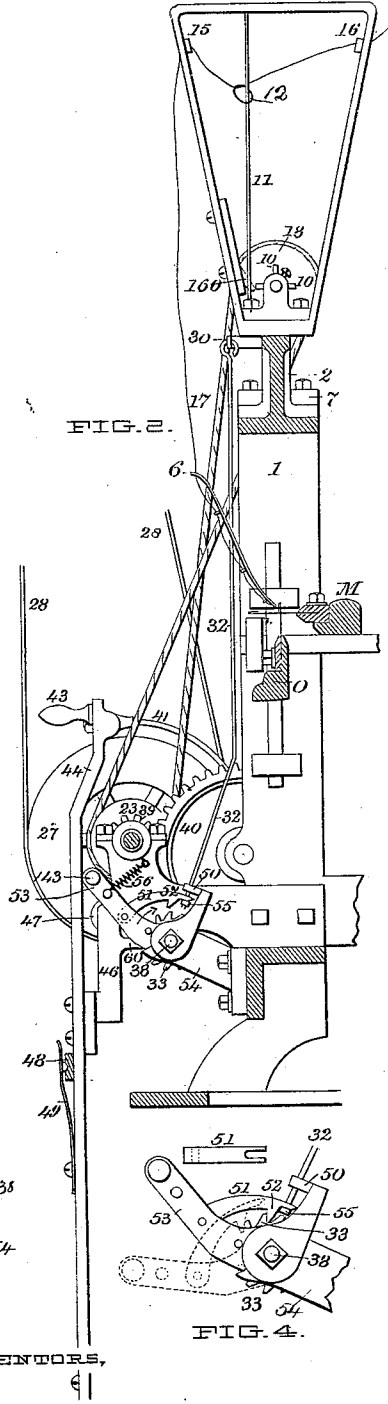


FIG. 4.

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QUARTER-SAVER FOR FLAT-RIB KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 521,191, dated June 12, 1894.

Application filed June 12, 1893. Serial No. 477,279. (No model.)

To all whom it may concern:

Be it known that we, ELI TIFFANY, of the village of Bennington, in the county of Bennington and State of Vermont, and GEORGE E. PARKER, of the city of Amsterdam, in the county of Montgomery, in the State of New York, have invented certain new and useful Improvements in Quarter-Savers for Flat-Rib Knitting-Machines; and we hereby declare that the subjoined description, together with the accompanying drawings, constitute a specification thereof and of the best method of constructing and using the same.

This invention is used in connection with that class of knitting machines which is employed in knitting flat ribs and analogous articles wherein several separate webs or strips of fabric are simultaneously produced, the machine being divided into sections for that purpose.

The object of the invention is to provide means which are under the control of each feed thread for stopping the machine whenever a break occurs in any one of the several feed threads so that the web or fabric which is being produced on that particular section of the machine where the break in the feed thread occurs, shall not be cast off the needles by the knock-over bar before the machine is stopped and an opportunity is afforded for piecing up the broken thread, or introducing a new one when the stoppage is produced by the old feed thread running out.

The invention is here shown as applied to a straight machine for knitting flat ribs which are used as cuffs for knit under-wear.

The drawings fully illustrate the invention, in which—

Figure 1 is a front elevation of a part of such a machine with these improvements applied thereto. Fig. 2 shows a section of the same. Fig. 3 is an enlarged detail of the front view of the ratchet and brake cam. Fig. 4 is an enlarged end elevation of the same.

The mechanism will first be described, after which the features of invention will be pointed out in the claims.

Nos. 1 and 2 represent the standard and a part of the top of an ordinary straight rib knitting machine. The yarn carrier bar is

shown at 5 and it slides in the bed 4. It carries a series of yarn guides 6 only one of which is shown, which are provided with loops, rings or staples which serve as guides to conduct the thread to the needles. On the top of the crosshead 2 as many guide standards 13 are erected as there are sections in the machine. These are of substantially the style shown in Fig. 2, each being provided near the top of each leg with the guide eyes 15 and 16. Near the bottom of the standards journal bearings are provided in which the shaft 8 revolves. This shaft carries a cam clutch composed of the fixed member 20 and the loose member 19. The latter is fitted with a pulley 18 and can both revolve and slide axially on shaft 8. With reference to member 20 the engaging cam faces are so adjusted that if the motion of the shaft and member 20 is arrested, member 19 can still rotate, the cam face of the latter riding up onto the cam face of its fellow and out of engagement therewith, the motion of the driver being as shown by the arrow, the driving contact faces between the two members being the cam faces and not the faces which are parallel with the axis of the shaft. Driving contact between the two members of the clutch is maintained normally by the spring 21 interposed between the collar 22 and the sheave pulley 18. This pulley is connected by belt 17 with a driving pulley 23 on the main driving shaft 24 and runs at all times when the machine is running. On the shaft 8 near each standard 13 a small fixed hub or collar 9 is placed which is equipped with short radial fingers 10. When the shaft revolves these fingers in rotation pass opposite the interval between two upright parallel wires 11 on which a small ring 12 is fitted to rise and fall as explained farther on. Opposite the path of revolution of the fingers 10 and projecting beneath the drop of ring 12 is a beveled ledge 160 which is an appurtenance of standard 13 the function of which is when the ring drops onto it to cause the same to slide down its incline so that its under curve will fall in the path of the fingers 10 as they pass around and thus arrest the revolution of shaft 8 and of the clutch member 20.

A lever 30 is pivoted to the edge of the bracket 7 which supports the outer end of shaft 8 with one of its arms bent up and fitted to bear against one side of pulley 18 and having a drop rod 32 suspended from its other arm. The slip of the clutch member 19 on the shaft 8 causes oscillation of lever 30 on its fulcrum pivot whereby the rod 32 is caused to rise and fall. This rod passes through guide 50 Fig. 4 and its bottom end plays through the forked end of the clawker 51 which is pivoted on the arm 53. A plan view of the clawker showing this forked end is shown just above Fig. 4. The rod 32 has an adjusting nut 55 on its lower end beneath the under side of the clawker. This is provided for the purpose of regulating the elevation of the clawker tooth above the points of the teeth on the ratchet when it stands idle in its highest position. This clawker tooth 52 is adapted to engage the teeth on the ratchet 33 when the free end of the clawker is dropped by the descent of the rod 32, and whenever this occurs such engagement arrests the forward movement of the ratchet. The lever 53 to which the clawker is attached is pivoted on the axis of the ratchet and is supported in its elevated position by a spring 56 and has a limited throw to enable the operator to work the ratchet backward at any time when it may be necessary. The ratchet revolves on a stud 38 which projects from the bracket 54 and one end of its hub 34 constitutes one member of the cam clutch of which the other member 35 carries the spur gear 36 which meshes with and receives motion from the gear 40 which is driven by the pinion 39 on the main driving shaft. This cam clutch is like the cam clutch 19—20 previously described, the member 35 being adapted to slide axially along stud 38 and is normally forced toward and is held in driving contact with its fellow 34 by spring 37. The cam faces of the clutch members extend around only a portion of the circumference of the cam cylinders, the remaining portion being squared off in a diametrical plane. Sometimes it happens that when the machine stops the square end of one half of the clutch will stand against the square end of the other portion, and when this happens and the machine is ready to start again, the ratchet can be run back by means of the lever 53 until the two cam faces are brought into apposition, when the spring 37 forces them into contact. Whenever the drop of the clawker tooth 52 stops the rotation of the ratchet 33 and clutch cam 34, the further rotation of gear 36 forces cam 35 laterally to the left when the gear 36, striking the projection 60 on arm 46, which is an adjunct of the belt shifting lever 44 and is provided with a brake pad 47, for action in unison with the belt shifter, forces the pad against the brake face 27 of the driving pulley 26 and thereby suddenly arrests the motion of the machine.

The agencies for shifting the belt and sud-

denly stopping the machine consist of the belt shifting fingers 41 41 which are attached to the arm 42 which in turn projects from the belt shifting lever 44. This is pivoted to the frame at 45 and swings laterally to the right and left. It moves behind a guard 48 and is provided with a locking spring 49 having a stud or knuckle on its back side which takes into holes or countersinks in the face of the guard plate 48 to hold the lever in position. An arm or bracket 46 projects from this lever which carries a brake pad as above described.

The machine is driven by the belt 28 which runs with fast pulley 26 and loose pulley 25 on shaft 24. Pulley 26 has a driving sheave pulley 23 and friction flange 27 connected with it in the manner and for the purposes shown.

The operation of the apparatus is as follows:—The feed thread is taken from the bobbin and carried through the eye 16, ring 12 and eye 15 down to the carrier 6 and thence to the needles in the usual way. Cam clutches 20 and 34 are then turned so that their companion parts may be put in adjustment by the action of springs 21 and 37 forcing them into position. The lever 44 by means of handle 43 is then thrown to the right which ships the driving belt 28 onto pulley 26 and also takes the brake pad 47 off the flange 27. The action of spring 21 against cam clutch 19 effects the raising of the drop rod 32 through lever 30, thus lifting the end of the clawker 51 and thereby disengaging tooth 52 from connection with the ratchet 33 and leaving the latter free to rotate. Thus adjusted the machine is ready for operation and the power is on. If the yarn runs out or breaks the ring 12 falls into the pathway of revolution of the fingers 10 one of which engaging it arrests motion of shaft 8. This brings cam clutch 20 to a standstill, but 19 being still in motion in the direction of the arrow is crowded along on shaft 8 by the action of the cam faces, thus permitting lever 30 to oscillate and rod 32 to descend until clawker 51 drops and engages one of the teeth of the ratchet 33, at which moment, motion of that and of cam clutch 34 is checked. But cam clutch 35 and gear 36 being still in engagement with the driving gears 39—40, still revolve, and as a result, they are axially forced back along stud 38 by the action of the cooperating cam faces toward the driving pulley 26, and the side of the gear pressing against pad 60 on the inside of the bracket arm 46, forces the brake pad 47 against the flange 27 and lever 44 over to the left, which movement, by means of fingers 41 41 shifts the driving belt onto the loose pulley and, in connection with pad 47 acting on brake face 27 stops the machine. In this position of the lever 44 it is locked by spring 49 engaging a hole of the guard 48.

The action of the apparatus is such that the greatest brake pressure is not applied to the flanged pulley rim until the highest points

of the cam inclines have obtained opposite contiguity, or at the moment when the squared ends of the clutch hubs have come into juxtaposition. The design is to have the machine stop when these two square ends are in that position. When this is the case it makes no difference whether the shifter lever is held by its fastening or not for the position of the two clutch members is such, being end to end that the brake pressure cannot be released until one half of the clutch has been worked over, until the square shoulders of the two halves have passed each other, when the spring 37 will force them together into working position.

We therefore claim as our invention the following:

1. The combination of the drop ring, means for guiding said ring toward and arresting and holding it in the path of revolution of the fingers of a rotating spider, and a rotating spider, combined and arranged to operate substantially in the manner described and for the purpose set forth.

2. The shifting lever carrying the belt shifting fingers and the brake pad, in combination with the clutch having the described cam faces and square ends, means connected with one of the clutch members for stopping it at the emergent moment, and the brake flange or face on the driving shaft against which the brake works, constructed and arranged to operate substantially in the manner described and set forth.

3. The combination of the drop ring the guide wires on which it slides, the revolving spider, a belt shifter and the described clutch; with devices interposed between said clutch and the belt shifter for stopping the machine, substantially as specified.

4. The combination with the brake pulley of the described cam clutch having the cam faces and squared ends, and a brake pad interposed between the driving member of the clutch and the brake flange substantially as specified.

5. The combination of the drop ring, the

wires on which it slides, the guiding lug between the wires opposite the spider, and a shaft carrying a spider and the described cam clutch, substantially as specified.

6. The combination with the upper and lower cam clutches of the interposed lever 30, drop wire 32, clawker 51 and ratchet 33, substantially as and for the purposes described and set forth.

7. The combination with the described cam clutch of the ratchet, the clawker lever and the clawker substantially as specified.

8. The combination of the described cam clutch, a ratchet connected with one member thereof and rotating on a common axis, a clawker and clawker lever for actuating said ratchet, and a spring disposed outside of the loose member of the clutch for maintaining normal contact between the cam faces of the clutch, constructed and arranged to operate substantially in the manner and for the purposes specified.

9. A clutch consisting of a sliding, rotating member and of a non-sliding, rotating member, between which are the contact faces which consist in each of a cam face and a square end fitted so as to be substantial counterparts of each other, and means interposed between the driving member of said clutch and the main driver of the machine, in virtue of which the axial movement of the sliding member, caused by the separation of the cams due to the action of the non-sliding member upon or against the sliding one, shall throw off the power, and the position of the two members of the clutch in contact end to end shall hold locked the cut off power devices until released, substantially in the manner described and for the purposes specified.

In witness whereof we have hereto subscribed our names this 29th day of October, A. D. 1892.

ELI TIFFANY.
GEO. E. PARKER.

In presence of—

FRANKLIN SCOTT,
F. M. TIFFANY.