

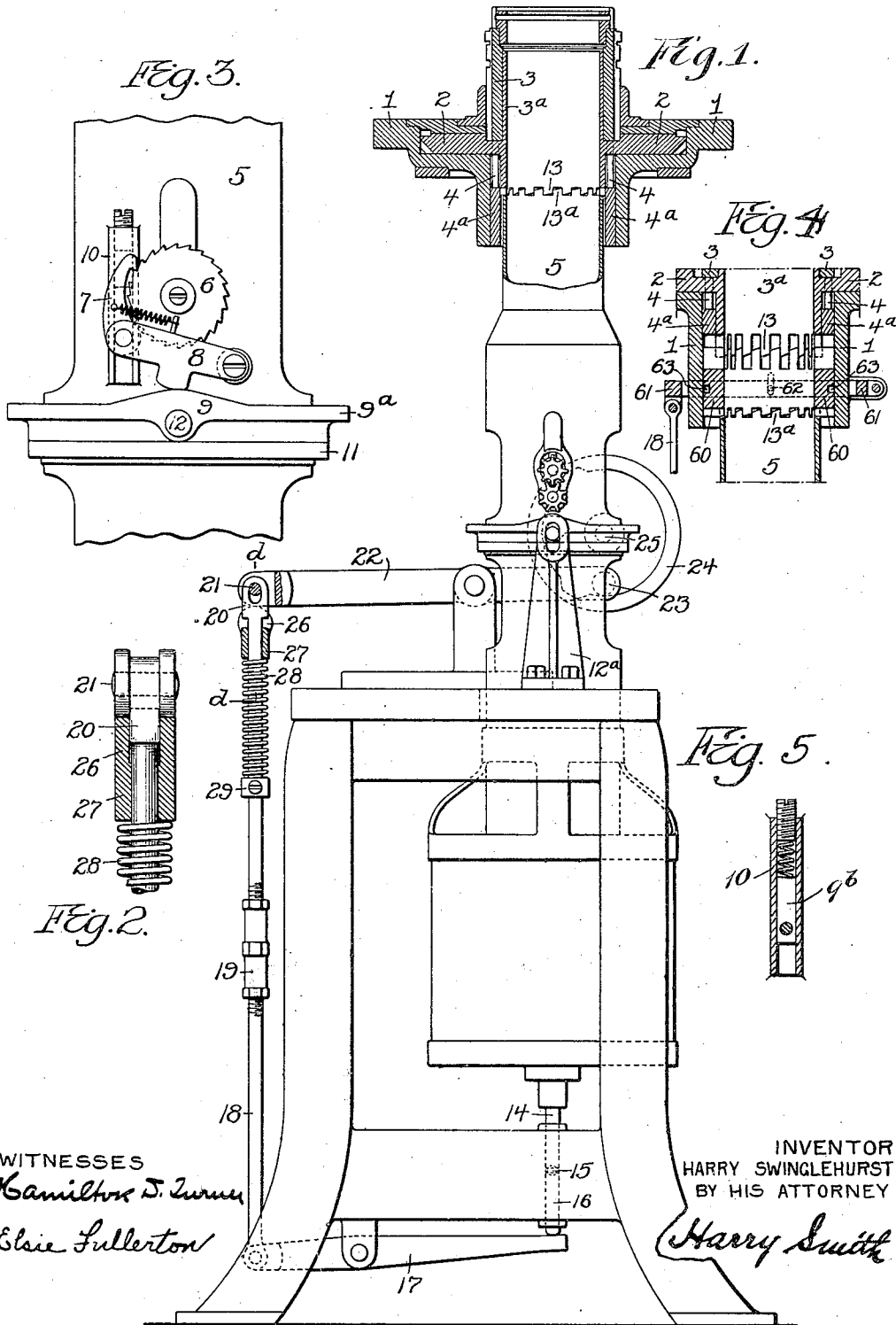
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WEB RECEIVER AND TAKE-UP MECHANISM FOR KNITTING MACHINES.

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UNITED STATES PATENT OFFICE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HARRY SWINGLEHURST, a citizen of the United States, residing in Boston, Massachusetts, have invented certain Improvements in Web Receivers and Take-Up Mechanism for Knitting-Machines, of which the following is a specification.

My invention relates to that class of knitting machines which are intended for knitting stocking webs with seamless heel and toe pockets thereon, and in which the cylinder has rotating movement during the knitting of the tubular web for the leg or foot of the stocking and reciprocating or to-and-fro movement during the knitting of the heel and toe pockets, the object of my invention being to lessen the shock and strain upon the machine during the time that the reciprocating or to-and-fro movement is being imparted to the cylinder. This object I attain by disconnecting the parts carrying the web receiver or take-up mechanism from the cylinder during the reciprocating movements of the latter.

In the accompanying drawings—Figure 1 is a view, partly in side elevation and partly in vertical section of sufficient of a knitting machine to illustrate my invention; Fig. 2 is an enlarged view, partly in elevation and partly in transverse section, on the line *d—d*, Fig. 1; Fig. 3 is a side elevation of part of the take-up mechanism of the machine; Fig. 4 is a vertical sectional view illustrating a certain adaptation of my invention, and Fig. 5 is a sectional view illustrating one of the elements of the take-up operating device. In Fig. 1 of the drawings, 1 represents part of the bed plate of the machine which has bearings for a bevel wheel 2 upon which is mounted the needle cylinder 3 of the machine, the bevel wheel being intended to mesh with another bevel wheel on a shaft at one side of the machine, which shaft is provided with mechanism of any suitable character for imparting either rotary or to-and-fro motion thereto. Such mechanism is known in that type of machine to which my invention relates, and one form of such mechanism is shown and described in Letters Patent of George D. Mayo, No. 726,178, dated April 21, 1903, therefore I have not considered it necessary to describe it.

The cylinder of the machine is mounted in a cylindrical carrier 3^a which, in the present instance, forms part of the bevel wheel 2, the cylinder being mounted upon pins 4 which pass through openings in the bevel wheel and rest upon a ring 4^a, the latter being contained in a depending portion of the fixed frame 1 so that by raising or lowering said ring the cylinder 3 can be correspondingly raised or lowered. Other means of connecting the cylinder 3 to the bevel wheel 2 so that it partakes of either the rotary or to-and-fro movements of the latter may, however, be adopted within the scope of my invention.

Below the cylinder of the machine is a frame 5 which, as shown in Fig. 1, is of cylindrical form, the knitted web being fed downwardly thereinto so that it constitutes a receiver for said knitted web, which may be permitted to accumulate therein until a considerable length of web has been produced, whereupon the lower portion of the web may, at a time when the receiver is not rotating, be severed from the upper portion of the web and removed from the receiver, openings being formed in the sides of the receiver for permitting access to the web for this purpose.

The receiver may or may not be provided with take-up mechanism for the knitted web, or, on the other hand, the take-up mechanism may constitute the receiver for said web, an open framework, hence the term "receiver," as used in my claims, may, unless qualified by the context, be construed to mean either a receptacle in which the knitted web is permitted to accumulate or appropriate take-up mechanism for the knitted web.

In the construction shown in Fig. 1 take-up mechanism is combined with the receiver 5, said take-up mechanism comprising the usual pair of take-up rolls geared together so as to rotate in unison, one of the take-up rolls being provided with a ratchet wheel 6 which is engaged by a pawl 7 pivotally mounted upon a lever 8 hung to the receiver 5 and moved in one direction by a cam 9 and in the other direction by a spring-actuated plunger 9^b contained in a casing 10 on the receiver. (See Fig. 5). The cam 9 forms part of a ring 9^a which rests upon a flange 11 on the receiver but

is prevented from turning therewith by engagement of a pin 12 thereon with a slotted bracket 12^a mounted upon the fixed lower framework of the machine, as shown in Fig. 1.

Usually in machines of the type to which my invention relates the receiver is permanently connected to the cylinder or its drive wheel and partakes both of the rotary and reciprocating movements of the latter but such construction is objectionable because the receiver is relatively heavy and acquires considerable momentum during each reciprocation of the cylinder, which momentum must be overcome at every change in the direction of reciprocation of said cylinder with the result that the machine is subjected to severe strains during the time that reciprocating or to-and-fro knitting is being performed. In carrying out my invention I relieve the machine from such strains by releasing the receiver from engagement with the cylinder drive mechanism during the time that reciprocating movement is being imparted to the latter.

Referring first to Fig. 1 of the drawings it will be noted that the cylinder carrier 3 has a depending tubular portion whose lower end is provided with teeth 13 which are adapted to engage with corresponding teeth 13^a at the upper end of the tubular web receiver 5. The latter is capable of being raised so as to cause such engagement of the teeth 13 and 13^a or of being lowered so as to withdraw the teeth 13^a from engagement with the teeth 13, the means for effecting these movements being shown in Fig. 1 and being as follows: The lower end of the web receiver 5 has a depending rod 14 mounted so as to be free to rotate and to rise and fall in a bearing in the lower portion of the fixed frame of the machine, said rod 14 being recessed at the lower end for the reception of the upper portion of a ball 15 whose lower portion rests in the recessed upper end of a rod 16 mounted so as to be free to rise and fall in a bearing in the fixed frame and resting at its lower end upon one arm of a lever 17 pivoted to said fixed frame, and having its other arm connected to the lower end of a rod 18 having an adjusting turn-buckle 19, and provided at its upper end with a head 20 vertically slotted for the reception of a pin 21 on one arm of a lever 22, the latter being pivotally mounted on the fixed frame and having on its other arm an anti-friction roller, stud, or projection, 23, which engages a cam ring 24 on a shaft 25, the latter being operated so as to have a single turn during each complete cycle of operation of the machine and serving also to control the mechanism whereby change is effected from rotating to reciprocating movement of the needle cylinder, as set forth in Letters Patent 726,178

before noted. The lever 22 is forked at one end for the reception of the head 20 of the rod 18 and this forked portion of the lever bears upon ears 26 upon a sleeve 27 which is free to slide vertically upon the upper portion of the rod 18 and is supported by a coiled spring 28 surrounding the rod and interposed between the sleeve 27 and a collar 29 on the rod. The cam ring 24 is so constructed, that, whenever the cylinder driving mechanism is shifted so as to change the movement of the cylinder from rotating to reciprocating, the lever 22 will be actuated so as to permit the rod 18 to rise and the receiver 5 to fall sufficiently to carry its teeth 13^a out of engagement with the teeth 13 of the cylinder carrier 3^a, and, whenever the cylinder driving mechanism is actuated so as to change the movement of the cylinder from reciprocating to rotary, the lever 22 will be actuated so as to force the rod 18 downwardly and thereby lift the receiver 5 so as to carry its teeth 13^a again into engagement with the teeth 13 of the cylinder carrier 3^a. During the time that the needle cylinder is being reciprocated, therefore, in the formation of the heel or toe pocket upon the knitted tube, the receiver 5 will be released from connection with the cylinder carrier and will remain in a quiescent condition, but during the time that the needle cylinder is being rotated the receiver will be in engagement with the cylinder carrier 3^a and will rotate therewith. If the lever 22 should chance to be actuated at such time that the lift of the receiver would be prevented by contact of the ends of the teeth 13, 13^a, the sleeve 27 will be depressed so as to compress the spring 28 and as soon as the ends of the teeth 13 and 13^a have passed each other the recoil of the spring 28 will serve to depress the rod 18 and raise the receiver 5 so as to force the teeth 13^a into engagement with the teeth 13. Both sets of teeth are preferably straight-sided as shown in Fig. 1 so that when in engagement any tendency to independent movement of either the needle carrier or receiver will not force the teeth out of engagement with one another.

In Fig. 4 I have shown a modification of the machine shown in Fig. 1, whereby the raising and lowering of the web receiver and take-up mechanism is rendered unnecessary. In this modification a ring 60 is interposed between the toothed upper end of the web receiver 5 and the toothed lower end of the cylinder carrier 3^a, this ring being capable of being moved vertically by any suitable operating device as for instance a ring 61 pivoted at one side of the depending hub on the bed plate 1 and engaged on the opposite side of the same with an operating rod corresponding with the rod 18 shown in Fig. 1, this ring having at each

side a pin 62 passing through a slot in said hub and engaging an annular groove 63 in the ring 60 so as to impart vertical movement thereto without interfering with the rotary movement thereof. In this case the rod 18 may be connected to the lever 22 by devices similar to those shown in Fig. 1, and the rod 18 will, in such case, extend upwardly from the lever 22 instead of downwardly therefrom. The ring 60 has teeth both upon its upper and lower edges, the teeth on the upper edge being deep and being constantly in engagement with corresponding deep teeth on the cylinder carrier 3^a while the teeth on the lower edge of the ring are relatively shallow and can thus be moved out of and into engagement with the teeth on the upper edge of the web receiver as the ring 60 is raised and lowered.

I claim:

1. The combination of a knitting machine having a rotating and reciprocating needle cylinder with a toothed member thereon, a web receiver also having a toothed member, and means whereby the toothed member of the needle cylinder is put in or out of driving connection with the toothed member of the web receiver.

2. The combination of a knitting machine having a rotating and reciprocating needle cylinder with toothed member thereon, a web receiver also having a toothed member, a member interposed between said toothed members and having teeth for engaging with each, and means for moving said intermediate toothed member so as to cause it to connect or disconnect the cylinder member and receiver.

3. The combination of a knitting machine having a rotating and reciprocating needle cylinder with toothed member thereon, a web receiver also having a toothed member, a member interposed between said toothed members and having teeth in permanent engagement with one of the aforesaid toothed members but susceptible of movement so as to carry its teeth into or out of engagement with the other of said toothed members.

4. The combination of a knitting machine having a rotating and reciprocating needle cylinder with toothed member, a web receiver likewise having a toothed member, mechanism for effecting change in the movements of the needle cylinder and mechanism cooperating with that which effects change in the movements of the needle cylinder and serving to operatively connect said toothed members during the rotating movements of the needle cylinder and disconnect them during the reciprocating movements of the needle cylinder.

5. The combination of a knitting machine having a rotating and reciprocating needle cylinder with toothed member thereon, a web receiver also having a toothed member, and means for operatively connecting and disconnecting said toothed members, the teeth of both members having straight sides.

6. The combination of a knitting machine having a rotating and reciprocating needle cylinder with toothed member, a web receiver likewise having a toothed member, and means for operatively connecting and disconnecting said toothed members, said means having as elements members movable in respect to one another and a spring interposed between them.

7. The combination of a knitting machine having a rotating and reciprocating needle cylinder with toothed member, a web receiver likewise having a toothed member, means for operatively connecting and disconnecting said toothed members, and take-up mechanism carried by said web receiver and having as elements ratchet mechanism, an actuating cam therefor mounted on the web receiver, and means for engaging the said cam so as to prevent rotation of the same with the web receiver.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

HARRY SWINGLEHURST.

Witnesses:

ARTHUR M. BLADES,
THERESA F. MURPHY.