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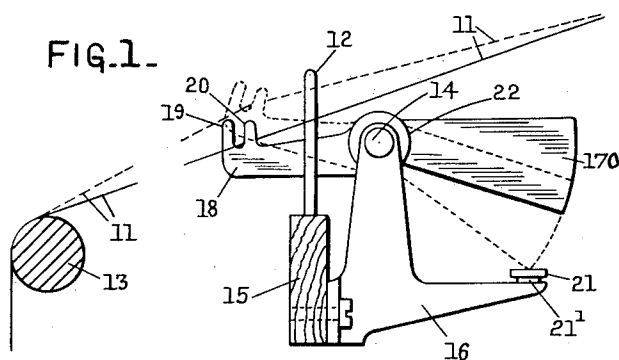
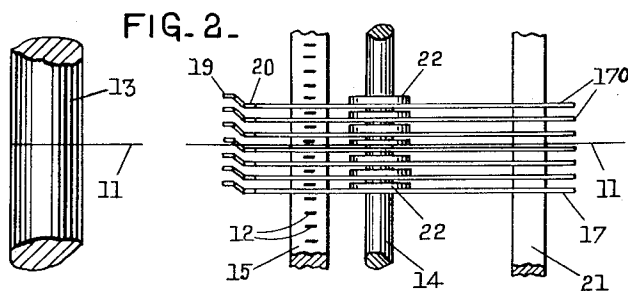
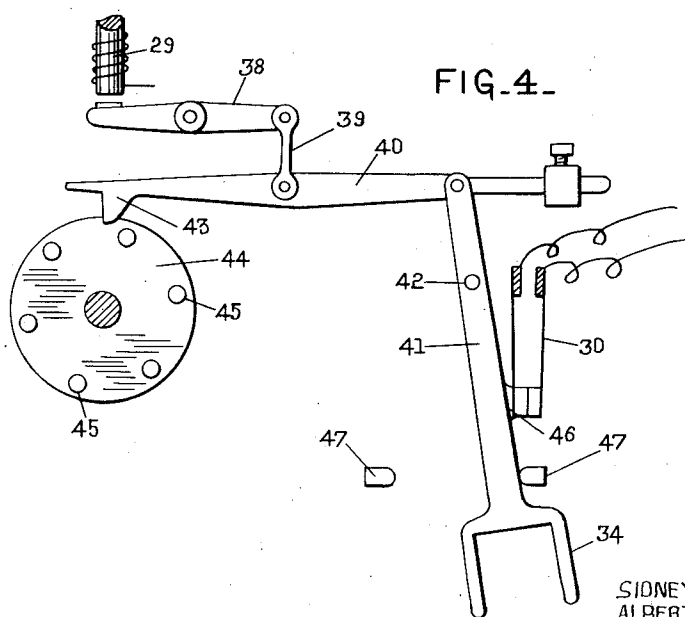
S. A. WELCH ET AL

1,942,524

FEEDING OF TEXTILE MATERIALS

Filed April 28, 1930

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 3.

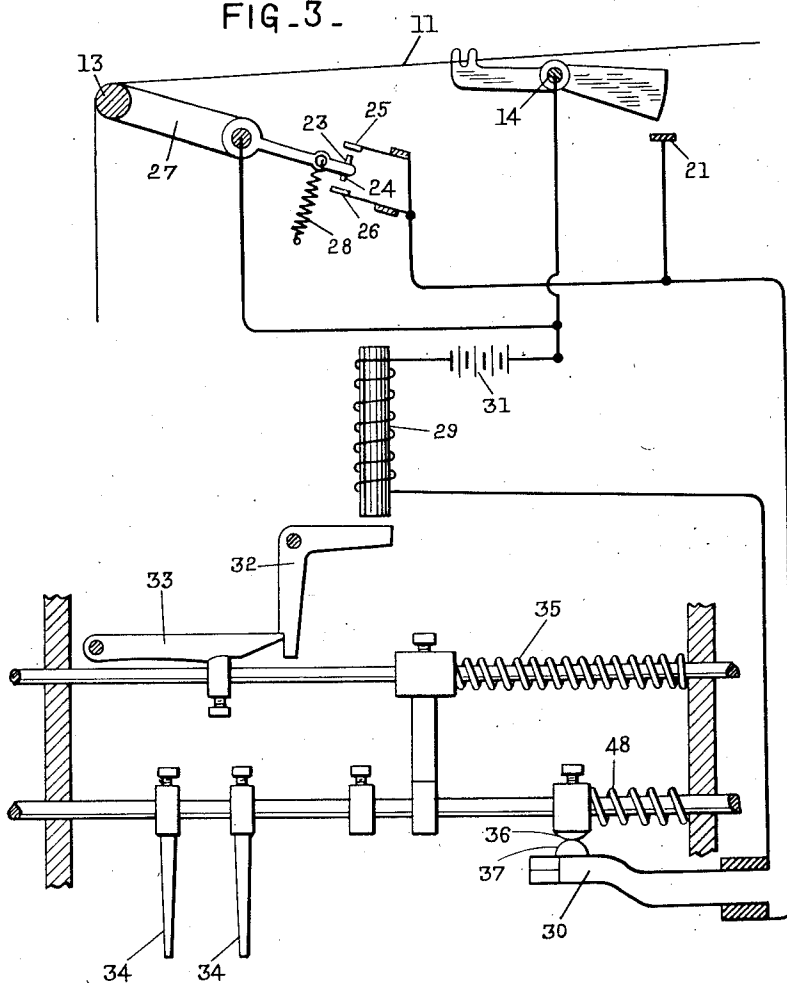
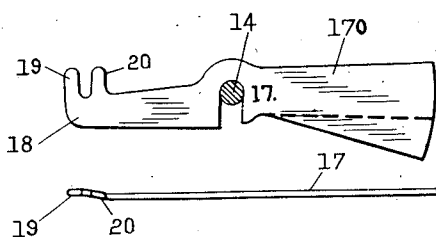


FIG. 5.



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1,942,524

FEEDING OF TEXTILE MATERIALS

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in Great Britain May 21, 1929

10 Claims. (Cl. 66—163)

This invention relates to the simultaneous feeding of a plurality of yarns or threads and has for its principal object an improved stop motion that is operable on the breakage of a yarn or thread to stop the feeding of the yarns or threads. A further object of the invention is to stop the feeding of the yarns or threads on the occurrence of excessive variation in the tension of individual yarns or threads, or in the whole of the yarns or threads. The invention is capable of wide application, and may be used in such operations as, for example, warping, beaming, and creeling, and the feeding of yarns or threads to weaving looms and warp-knitting machines.

According to the invention, a pivoted member is provided in connection with each of the plurality of yarns or threads (hereinafter referred to as "threads"), the pivot of the member being so placed that the tendency of the member is to move so as to contact with a conducting bar, and complete an electric circuit between this bar and a second conductor which is conveniently the pivot rod of the pivoted members. The two conductors are connected to an electric stop-motion mechanism, so that when any pivoted member is allowed to make contact with the conducting bar, feeding of the whole of the threads ceases.

During feeding, each thread maintains its associated pivoted member out of contact with the conducting bar, the tension of the thread being just sufficient to overcome the tendency of the pivoted member to move towards the bar. On the breakage or slackening of any thread, this constraint is removed from the pivoted member which thereupon completes the electric circuit of the stop-motion mechanism to stop the feeding of the threads.

The pivoted members and their associated parts may operate in conjunction with a stop-motion which is rendered operative in the event of excessive variation of the tension of the threads as a whole. Thus, the threads may be caused to pass over a tension bar which is movable against spring or weight action, any variation in the tension of the threads causing or allowing contacts on the tension bar to engage contacts included in the stop-motion circuit.

Various embodiments of the invention will now be described in greater detail, with reference to the accompanying drawings, but it is to be understood that the following description is given by way of example only, and is in no way limitative. The embodiments shown are particularly applicable to warp knitting machines, but are not limited to such application.

In the drawings:

Figure 1 is an elevation, and Figure 2 a plan view of a series of pivoted members and their associated parts.

Figure 3 is a diagram of the electrical stop-motion circuit and one form of stop-mechanism;

Figure 4 shows a further form of stop-mechanism; and

Figure 5 shows a modification of the pivoted member used in the invention.

Referring to Figures 1 and 2, a number of threads 11 are taken from a beam or creel and passed through a reed or sley 12 and over a tension bar 13 to the needles of a warp knitting machine. A rod 14 is carried by brackets 16 from the sley bar 15 and runs along the length of the reed or sley, serving as a pivot for a number of pivoted members 17 of which one is provided for each thread. Each pivoted member comprises a two-armed lever, one arm 18 of which projects between the teeth of the reed or sley and is guided thereby and terminates in an upstanding fork comprising prongs 19, 20, for engagement with the thread.

In order to interfere as little as possible with the straight passage of the thread through the sley and through the fork, one limb 19 of the fork is bent or cranked in relation to the other limb 20.

The other arm 170 of the lever is somewhat heavier than the thread engaging arm 18, and so tends to move downwards into contact with a conducting bar 21 supported by insulating material 21' on the brackets 16 in which the pivot rod is mounted. The pivot rod forms one contact for the pivoted members, and is connected together with the conducting bar in the stop-motion circuit, as will appear hereafter.

Discs 22 are arranged between the pivoted members in order to space them correctly, it being preferred to secure a disc to each pivoted member. By this means also, a good electrical connection is effected between the pivoted members and the pivot rod.

The pivoted members may be pierced, to be slid over the end of the rod 14, upon which they are pivoted, but they are preferably slotted, as shown in Figure 5, so that they can be simply dropped on to the bar. It is preferred that the arms 170 of those members 17 which engage threads near the ends of the warp are somewhat lighter than those engaging the threads in the remainder of the warp, Figure 5 showing how the shape of the arm 170 may be modified for this purpose.

In Figure 2 the tension bar 13 over which the threads pass after leaving the reed or sley is car-

ried by arms 27 pivoted to the frame of the machine, and is free to oscillate against the action of a spring 28 or alternatively a counter-balancing weight. On one of the arms carrying the tension bar a pair of contacts 23, 24 is provided, a further pair of contacts 25, 26 being carried by but insulated from the machine frame, so as to make connection with the contacts 23, 24 on the tension bar arms should the tension of the thread increase or decrease to give excessive movement to the tension bar in either direction.

The tension bar contacts 23, 24 are connected together to one terminal of the stop-motion circuit, in this case the terminal to which the pivot rod 14 is connected, and the other two contacts are together connected to the other terminal to which the contact bar 21 is connected. The circuit is completed through an electro-magnet 29, a cut-out switch 30 and a battery 31.

The electro-magnet 29 when energized may operate to actuate the stop-motion in various ways. According to the method illustrated in Figure 3, it attracts a pivoted latch 32 to release a trip lever 33 which holds the belt fork or shifting gear 34 of the machine over the fast pulley in opposition to a spring 35, the trip lever when released allowing the spring to move the belt fork on to the loose pulley. The movement of the belt fork towards the loose pulley may be arranged to open the cut-out switch 30 above referred to, thus reopening the stop-motion circuit as soon as stoppage of the machine is effected.

In order to prevent any slackness in the threads incidental to the starting-up of the machine from putting the stop-motion into action by releasing any of the pivoted members, the belt fork 34 may be arranged to move somewhat past the point at which the belt is slipped on to the fast pulley, this movement of the fork being made in opposition to a spring 48. In starting the machine, the belt fork moves the belt to the fast pulley, and is then given this excess movement, and in this position of the fork a nose 36 projecting from the belt fork rod is held away from a co-acting projection 37 on a spring contact-arm of the cut-out switch 30 to allow the cut-out switch to remain open. As soon as the thread is being fed properly and any slackness sufficient to release any of the pivoted members is taken up, the belt fork is allowed to return to its normal position on the fast pulley under the action of the spring 48, and the projection 36 engages the nose 37 to close the switch 30.

In the modified apparatus shown in Figure 4, the electro-magnet 29 on being energized attracts one arm of a two-armed lever 38, the other arm of which is connected by a link 39 to a lever 40 pivoted to one end of a belt fork lever 41, which is pivoted at an intermediate point 42 of its length to the frame of the machine. The lever 40 is formed at one end with a latch 43 held normally above a disc 44 continuously rotated during the operation of the machine and carrying a number of pins 45 which project from one of its faces. When the lever 38 is attracted by the electro-magnet, the latch 43 is caused to move into the path of one of the pins 45 on the rotating disc 44, and the lever 40 carrying the latch is thus propelled to the right to rock the belt fork lever 41 and stop the machine.

A projection 46 on the belt fork lever closes the cut-out switch 30 in the stop-motion circuit during running of the machine. Stops 47 may be provided to limit the action of the belt fork.

When the feeding mechanism is driven by an

electric motor, the stop-motion circuit may operate through suitable devices to cut off the current to the motor directly, or the current may be cut off indirectly by adaptation of the stop-motion circuit to operate one or more of the safety devices usually associated with electric motor drive.

What we claim and desire to secure by Letters Patent is:—

1. Apparatus for uniformly feeding a plurality of threads, said apparatus comprising an electrical stop-motion circuit, a contact bar, a reed, and a pivoted member in connection with each thread, each pivoted member being guided by a dent in the said reed, and held out of contact with the contact bar by engagement with its associated thread, while adapted to move into contact with said bar on slackening of the thread, to close the electrical stop-motion circuit in connection with the feeding mechanism.

2. Apparatus for uniformly feeding a plurality of threads, said apparatus comprising an electrical stop-motion circuit, a loaded tension bar associated with the threads and movable against its load under variations of tension in the threads as a whole to close the stop motion circuit, a contact bar, a reed, and a pivoted member in connection with each thread, each pivoted member being guided by a dent in the said reed, and held out of contact with the contact bar by engagement with its associated thread, while adapted to move into contact with said bar on slackening of the thread to close the electrical stop-motion circuit in connection with the feeding mechanism.

3. Apparatus for uniformly feeding a plurality of threads, said apparatus comprising an electrical stop-motion circuit, a contact bar, a reed, and a pivoted member in connection with each thread, said pivoted member being guided by a dent in the said reed, and held out of contact with the contact bar by engagement with its associated thread, while adapted to move into contact with said bar on slackening of the thread to close the electrical stop-motion circuit in connection with the feeding mechanism, a starting device, and a cut-out switch adapted to be operated thereby to maintain the stop-motion circuit open at the commencement of the feeding operation whereby stoppage of the feeding mechanism owing to any variation in tension incidental to starting-up is prevented.

4. Apparatus for uniformly feeding a plurality of threads, said apparatus comprising an electrical stop-motion circuit, a loaded tension bar associated with the threads and movable against the loading under variation of tension in threads as a whole to close the stop motion circuit, a contact bar, a reed, and a pivoted member in connection with each thread, said pivoted member being guided by a dent in the said reed, and held out of contact with the contact bar by engagement with its associated threads, while adapted to move into contact with said bar on slackening of the thread to close the electrical stop-motion circuit in connection with the feeding mechanism, and means for maintaining the stop-motion circuit open at the commencement of the feeding operation whereby stoppage of the feeding mechanism owing to any variation in tension incidental to starting-up is prevented.

5. Apparatus for uniformly feeding a plurality of threads, said apparatus comprising a belt drive, an electrical stop-motion circuit adapted to operate belt shifting means in connection with

- said drive, a contact bar, a reed, and a pivoted member in connection with each thread, said pivoted member being guided by a dent in the said reed, and held out of contact with the contact bar by engagement with its associated thread, while adapted to move into contact with said bar on slackening of the thread to close the electrical stop-motion circuit in connection with the feeding mechanism, and a cut-out switch in the stop-motion circuit adapted to be opened by the belt shifting means and at the commencement of the feeding operation, whereby stoppage of the feeding mechanism owing to any variation in tension incidental to starting-up is prevented.
6. Apparatus for uniformly feeding a plurality of threads, said apparatus comprising a belt drive and electrical stop-motion circuit adapted to operate belt shifting means in connection with said drive, a loaded tension bar associated with the threads and movable against this loading under variations of tension in threads as a whole to close the stop-motion circuit, a contact bar, a reed, and in connection with each thread a pivoted member guided by a dent in the said reed, each pivoted member being held out of contact with the contact bar by engagement with its associated threads, and adapted to move into contact with said bar on slackening of the thread to close the electrical stop-motion circuit in connection with the feeding mechanism, and a cut-out switch in the stop-motion circuit adapted to be opened by the belt shifting means and at the commencement of the feeding operation whereby stoppage of the feeding mechanism owing to any variation in tension incidental to starting-up is prevented.
9. Apparatus for uniformly feeding a plurality of threads, said apparatus comprising an electrical stop-motion circuit, a contact bar, a reed a pivoted member for each thread, each pivoted member having a forked extremity, adapted to engage a corresponding thread, each pivoted member being guided by a dent in the said reed and held out of contact with the contact bar by engagement of the thread in the said forked extremity, while adapted to move into contact with said bar on slackening of the thread, to close the electrical stop-motion circuit in connection with the feeding mechanism.
10. Apparatus for uniformly feeding a plurality of threads, said apparatus comprising an electrical stop-motion circuit, a contact bar, a reed, a pivoted member having a forked extremity for each thread, said forked extremity having a plurality of prongs, at least one of which is off-set to permit free passage of the thread through the fork, said pivoted member being guided by a dent in the said reed, and held out of contact with the contact bar by engagement of the thread in the said forked extremity, while adapted to move into contact with said bar on slackening of the thread, to close the electrical stop-motion circuit in connection with the feeding mechanism.
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