UNITED STATES PATENT OFFICE.

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PROCESS OF SPINNING YARN.

SPECIFICATION forming part of Letters Patent No. 683,418, dated September 24, 1901.

Application filed July 29, 1901. Serial No. 70,151. (No specimens.)

To all whom it may concern:

Be it known that I, CHARLES H. ARNOLD, a citizen of the United States, and a resident of Grosvenor Dale, county of Windham, State of Connecticut, have invented an Improvement in Processes of Spinning Yarn, of which the following is a specification.

In the weaving of cloth it is quite necessary that the yarn shall weave off from the bobbin in the shuttle under sufficient and uniform tension, and this is particularly desirable when the last end of the filling is wound off, as otherwise it tends to coil up in a bunch or "curl," and being woven into the cloth seriously damages the appearance and value of the latter.

The doffing process in spinning by which the empty bobbins are placed on the spindles after removal of the full bobbins is supposed to insure proper and regular winding of the yarn from the start. In the old and time-honored process of doffing a spindle-frame the operative removes the full bobbins from the spindles, puts in their place empty bobbins in such position that each will hold the end of yarn from the previous bobbin just removed, and starts the frame, either by winding the yarn on the bobbin by hand or more usually by pressing the bobbin onto the spindle in such manner as to hold some of the yarn between the two. As a matter of fact it often happens that a large percentage—ten per cent. or more—break their threads immediately when the frame is started, thereby winding no yarn at all, and it is now customary for the operative to wind from a bobbin held in the mouth or hand several turns of yarn on the empty bobbin by catching the end in a loop around the barrel and permitting it to run, and then the thread is pieced up with this yarn wound on the bobbin and the spinning continues, but with a number of coils or turns of yarn at the start which have been wound without any regular tension and without any regular traverse. It is from such bobbins that the last end of the filling is most liable to weave a bunch into the cloth. The automatic filling-replenishing loom of the "feeler" type, so called, is in widely-extended use at the present day, and, as is well known to those skilled in the art, the filling is automatically replenished prior to complete exhaustion of the filling in the shuttle through the instrumentality of a feeler, which coöperates with the filling in the shuttle.

In order to operate with the greatest efficiency and economy, it will be manifest that the quantity of yarn remaining on a bobbin at the time of a change or replenishment of filling should be very small, and theoretically the feeler should effect the actuation of the replenishing mechanism when only enough yarn remains to permit travel of the shuttle at least once across the lay. This is necessary, owing to the usual construction of such looms, the replenishing mechanism being located at one side and the feeler at the other side of the loom, the yarn or filling remaining on the bobbin when the feeler detects the desired exhaustion being sufficient to permit a full or complete pick of filling to be laid as the shuttle is shot across from the detecting to the replenishing side of the loom. Now if the yarn is irregularly wound upon the bobbin at the start it will be manifest that the detecting action of the feeler will be interfered with and replenishing will be effected too soon, resulting in waste, or it will be delayed, resulting in one or more imperfect picks in the cloth. Again, in some of the feeler-looms bobbins are used which have a regular preliminary bunch or winding of the yarn formed thereupon prior to the formation of the main or service winding, the detecting action of the feeler taking place when the yarn has woven off down to the preliminary winding, and unless this is properly and regularly wound the loom will not operate to replenish filling at the desired time.

My present invention has for its object the production of a novel process of spinning yarn whereby the irregular spinning and winding and the formation of an arbitrary and objectionable bunch on the bobbin are entirely obviated and a regularly and uniformly wound bobbin produced.

In practicing my invention I put a set of empty bobbins on a spinning-frame and start it up, running the ring-rail up and down two or three times, or more, if desired, and then stop, doffing the frame. Each of the bobbins will have a small quantity of yarn wound

thereupon in a regular and even manner, all bobbins being discarded for the purposes of my invention whose ends have broken down during the operation described, and by repeating this step as often as necessary with empty bobbins I obtain a large supply of bobbins each having a small quantity of yarn regularly and uniformly spun thereupon. These bobbins, which may be termed "doffer-bobbins," are then distributed among the doffers, who are instructed as to the mode of using them. After doffing and getting a frame started if there is an end down on a bare or practically bare bobbin immediately after the doff such bobbin is removed and one of the doffer-bobbins is put on its spindle and the yarn thereon pieced up with the broken end, and spinning proceeds in usual manner. By this process all of the filling-yarn sent to the weave-room will weave off properly, inasmuch as the yarn on each bobbin is regularly spun and wound with a proper traverse from start to finish.

In actual practice by use of my process I have been able to reduce the "seconds" from forty per cent. to twenty per cent., a very remarkable result, and achieved in a mill wherein the goods are very closely inspected.

My invention is equally applicable in spinning yarn on bobbins having a preliminary and well-defined bunch or winding formed thereupon, as will be manifest, for a lot of doffer-bobbins could be spun with the regular and desired bunch and distributed to the doffers to be used in replacing the bobbins whose ends break down immediately after the formation of the bunch on the regular frame.

It will be understood by those skilled in spinning that the tendency of the ends to break down is greatest immediately after the frame is started, when the bobbins are bare, and after the spinning has been established if only a few turns of yarn have been wound the tendency to break down is greatly diminished.

By providing a doffer-bobbin to take the place of a practically bare bobbin whose end has broken down I not only obtain a uniformly and regularly wound bobbin, but I decrease the tendency to break down by the yarn in reserve on the doffer-bobbin. The amount of yarn wound on such doffer-bobbins can be varied according to circumstances without departing from the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An improvement in the process of spinning yarn, which consists in substituting a bobbin having a small and regularly-wound portion of yarn thereon for a bobbin whose end has broken down in starting up the frame after doffing; piecing up the broken end with the yarn on the substituted bobbin, and completing the spinning on the latter.

2. An improvement in the process of spinning yarn, which consists in regularly winding a portion of yarn upon a bobbin, to constitute a "doffer-bobbin;" substituting the same in a spinning-frame for a substantially bare bobbin whose end has broken down after doffing, piecing up the broken end with the yarn on the "doffer-bobbin," and completing the spinning of the yarn upon the latter in usual manner.

3. An improvement in the process of spinning yarn which consists in preparing a supply of "doffer-bobbins" by regularly spinning a small portion of yarn thereupon, substituting a "doffer-bobbin" for a bobbin whose end has broken down in starting the frame up after doffing, piecing up the broken end with the yarn on the "doffer-bobbin," and completing the spinning with the latter in usual manner.

4. In yarn-spinning, doffing the frame and starting up, removing the bobbins whose ends have broken down in starting and replacing them by bobbins each having a previously and regularly wound portion of yarn thereon, piecing up the broken ends with the yarn on the substituted bobbins, and completing the spinning in usual manner, whereby all the bobbins will be regularly and uniformly wound, and substantially alike as to the yarn loads thereupon.

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

CHARLES H. ARNOLD.

Witnesses:
FRED O. STONE,
J. BURTON TANSTELLOTTE.