

UNITED STATES PATENT OFFICE.

ISAAC E. PALMER, OF MIDDLETOWN, CONNECTICUT.

PROCESS OF PRODUCING YARN OR THREAD.

952,757.

Specification of Letters Patent. Patented Mar. 22, 1910.

No Drawing.

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To all whom it may concern:

Be it known that I, ISAAC E. PALMER, a citizen of the United States, and a resident of Middletown, in the county of Middlesex and State of Connecticut, have invented an Improvement in Processes of Producing Yarn or Thread, of which the following description is a specification.

This invention relates to a new and improved process of producing yarn or thread.

In order that the principles of the invention may be readily understood, I shall proceed to disclose the best manner known to me for carrying out the process.

Yarn or thread in its completed spun or twisted condition is, as now manufactured, characterized by protruding fibers and by fluffy portions, lumps and foreign matter, which render the yarn or thread uneven and unsightly and which prevent the formation of wholly acceptable fabrics. Heretofore so far as I am aware, it has been attempted to remove the said protruding fibers, fluffy portions and the like by unwinding the spun or twisted yarn or thread and feeding it while in such unwound condition to the action of clearing devices, after which the yarn or thread is rewound. This operation not only requires the use of special mechanism involving the expenditure of much time, but it is impossible by the use of any mechanism known to me to remove the protruding fibers, fluffy portions, etc., uniformly or completely from the surface of the yarn or thread after the same has been spun or twisted.

Heretofore, so far as I am aware, clearing devices for yarn or thread have not acted upon the entire surface thereof, but only along parts of the surface. For example, plates have been interposed in the path of the yarn or thread so as to scrape or bear upon one side of the thread, and in some cases two opposed plates have been provided between which the yarn or thread has been drawn, thereby acting upon opposite sides of the yarn or thread. In still other cases, projecting members, such as pins, have been positioned near the path of travel of the yarn or thread to remove therefrom occasional lumps of enlarged diameter which rise above the general surface of the thread. It is apparent, however, that in none of these cases is the entire surface of the yarn or thread acted upon. When these clearing devices are interposed in the path of travel of the yarn or thread as it is unwound from the

bobbin or spindle upon which it was spun onto another bobbin, the yarn or thread has had only longitudinal movement imparted thereto. In other words, it is drawn directly from one support to the other without any twirling or axial rotation.

In accordance with my invention I remove the protruding fibers, the fluffy portions, the knots and foreign matter from the yarn or thread while the fibrous strands are subjected to a mass rotation, or, in other words, while they are being axially twisted or twirled about each other during the spinning or twisting operation. In this manner, I repeatedly bring all portions of the surface of the mass of the strands into contact with the clearing elements. In this manner, it is possible to remove said protruding fibers and other unsightly or objectionable portions more readily and completely from the entire periphery or surface of the mass, and with the expenditure of much less time than has heretofore been consumed in attempting to remove such matter. Furthermore I wholly avoid the usual, subsequent step of untwisting the yarn or thread after the same has been spun or twisted, thus doing away with the use of special mechanism.

In treating yarn in accordance with my invention, I draw the fibrous strands which are to be incorporated therein until they are positioned in substantial parallelism in an untwisted condition and until the diameter of the mass of strands is reduced to approximately the diameter of the yarn or thread to be spun or twisted therefrom. I thereupon spin or twist the mass of strands by subjecting said mass to an axial rotation so as to twirl or twist the fibers about each other as a mass, and during such mass rotation or twisting or twirling of the fibers, I subject the said strands to the constant action of a suitable clearing device having a roughened and preferably firm or unyielding surface so as to act efficiently and thoroughly upon the strands. To this end, I may employ any suitable yarn clearing device, such, for example, as that shown in Figures 4, 5, 6 and 7 of my copending application No. 479,048. The strands during the clearing operation are not broken, and any and all manual manipulation thereof by the attendant is rendered unnecessary. The clearing device preferably employed acts primarily to remove protruding fibers and other described matter and acts secondarily

to compact or round the mass of strands so that the resulting yarn is of a more rounded and perfect character.

I may employ a plurality of clearing devices, such as that shown in my co-pending application, and pass the mass of strands under one of said clearing devices and then over the other, or vice versa, the strands being then led to the twisting or spinning spindle. It is apparent that in the use of a single clearing device the strands are most tightly twisted or spun between the spinning spindle and the clearing device, and that as said strands pass over the clearing device the tightness of the spinning or twisting action is somewhat reduced, owing to the contact of the strands with the clearing device. That is to say, as the strands pass over or in contact with the clearing device, the tightness of the twist approximates three-quarters or seven-eighths of the tightness of the completely spun or twisted yarn as wound upon the spinning or twisting spindle. If a pair of clearing devices be employed, the tightness of the twist between the two clearing devices is somewhat reduced and is still further reduced between the first of said clearing devices and the feeding or drawing rolls to which normally the twist of the yarn is conveyed.

I have already stated that the strands are subjected to the clearing operation during the act of spinning them into a yarn. It is impossible effectively to clear the strands until they have been drawn into such an attenuated condition that the diameter of the mass is substantially or approximately that of the resulting yarn, for the reason that undrawn or partially drawn masses of fiber present too large a surface for the thorough and uniform action of any clearing device with which I am familiar, and moreover because the fibers are not then in such a condition as to warrant their subjection to an effective clearing action.

My production of a cleared thread in accordance with my process is similar to that described for the production of a cleared yarn, the strands of which are incorporated into the thread being cleared during the twisting of the strands together. It is apparent moreover that if the strands be not cleared during the spinning or twisting operation, protruding fibers and other objectionable or foreign matter becomes more completely incorporated into the substance of or bound in by the twisting together of the strands, hence rendering their removal more difficult and in all cases preventing their entire or substantially entire removal by any subsequent process. Owing to the fact that when the yarn or thread is subjected to the clearing action heretofore described such yarn or thread is not completely and tightly spun or twisted, it is

possible more readily and completely to remove the protruding fibers, lumps and foreign matter than after the completion of the spinning or twisting action. It is, of course, evident that the spinning or twisting action is completed by winding the yarn or thread upon a spindle or bobbin, and hence if the clearing action be deferred until the yarn or thread is completely spun or twisted, it becomes necessary to unwind the same to subject it to a clearing action.

In carrying out my process, I maintain the strands of the yarn or thread in constant contact with the clearing element or elements employed, so that the strands are constantly acted upon thereby as opposed to an intermittent engagement of a yarn or thread with a clearing device upon the appearance of a knot or other pronounced protuberance, the appearance of which heretofore has frequently resulted in the breaking of the yarn or thread in the attempted clearance thereof.

It will be apparent from the foregoing description that by clearing the fibers of the yarn or thread during the spinning or twisting thereof, I obtain a more even laying and twist of plied and spun yarns and that the yarn is more compacted, rounded and polished.

It will be apparent from the foregoing description that by my process I not only produce a more thoroughly cleared yarn or thread, but that I accomplish this result with an expenditure of less time than has heretofore been employed in attempting to obtain the same product, and without the special machinery heretofore used to that end.

By the use of my invention I am enabled to obviate the necessity either partially or wholly of singeing the yarn or thread. I thus avoid a step heretofore resorted to in the manufacture of yarn or thread and materially reduce the cost of production thereof.

Having thus described one type or embodiment of my invention, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

Claims.

1. That process of producing yarn or thread which consists in subjecting individual fibrous strands to an axial mass rotation, thereby twisting them about each other, and superficially subjecting said strands during such rotation to a clearing action to remove protruding fibers, lumps and foreign matter.

2. That process of producing yarn or thread which consists in subjecting individual fibrous strands to an axial mass rota-

tion, thereby twisting them about each other, and during such rotation subjecting the entire periphery of said mass to a clearing action to remove protruding fibers, lumps and foreign matter.

3. That process of producing yarn which consists in drawing fibrous strands while in a substantially untwisted condition to position them in a substantially parallel, untwisted but attenuated condition for spinning, spinning said strands into yarn by axially rotating and twisting together the entire mass of attenuated strands, and subjecting the surface of said strands during such axial rotation and twisting together to a clearing action to remove protruding fibers, lumps and foreign matter.

4. That process of producing yarn which consists in drawing fibrous strands while in a substantially untwisted condition into a substantially parallel but attenuated condition and until the diameter of the mass of said strands is reduced to substantially that of the ultimate yarn to be produced therefrom, spinning said drawn strands into yarn by axially rotating and twisting the entire mass of said strands thus reduced in diameter, and subjecting the entire surface of said mass of drawn strands during such axial rotation and twisting to a clearing action to remove protruding fibers, lumps and foreign matter.

5. That process of producing yarn which consists in drawing fibrous strands while in a substantially untwisted condition, into a substantially parallel but attenuated condition and until the diameter of the mass of said drawn strands is reduced to substantially that of the ultimate yarn to be produced therefrom, spinning and winding upon a spinning or twisting spindle, said drawn strands, by axially rotating and twisting the entire mass of said drawn strands, and subjecting the entire surface of said mass of drawn strands during such axial rotation and twisting to a clearing action to remove protruding fibers, lumps and foreign matter.

6. That process of producing twisted plied yarn which consists in subjecting the individual fibrous strands of plied yarns to an axial mass rotation, thereby twisting said yarns together, and superficially subjecting said plied yarns during said mass rotation and twisting together, to a clearing action, to remove protruding fibers, lumps and foreign matter.

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

ISAAC E. PALMER.

Witnesses:

IRVING U. TOWNSEND,
M. H. LOWRY.