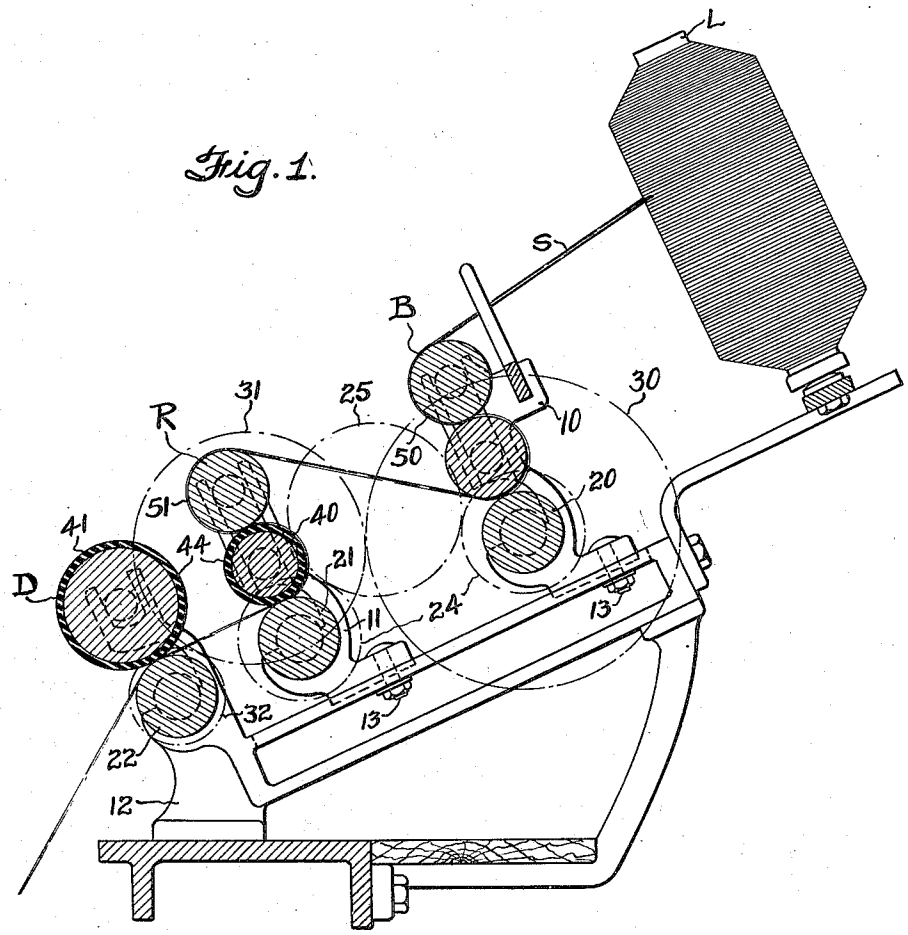
Jan. 5, 1937. J. G. OSWALD 2,067,062

DRAWING MECHANISM FOR SUBSTANTIALLY ELONGATED FILAMENTS

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Fig. 1.



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Fig. 2.

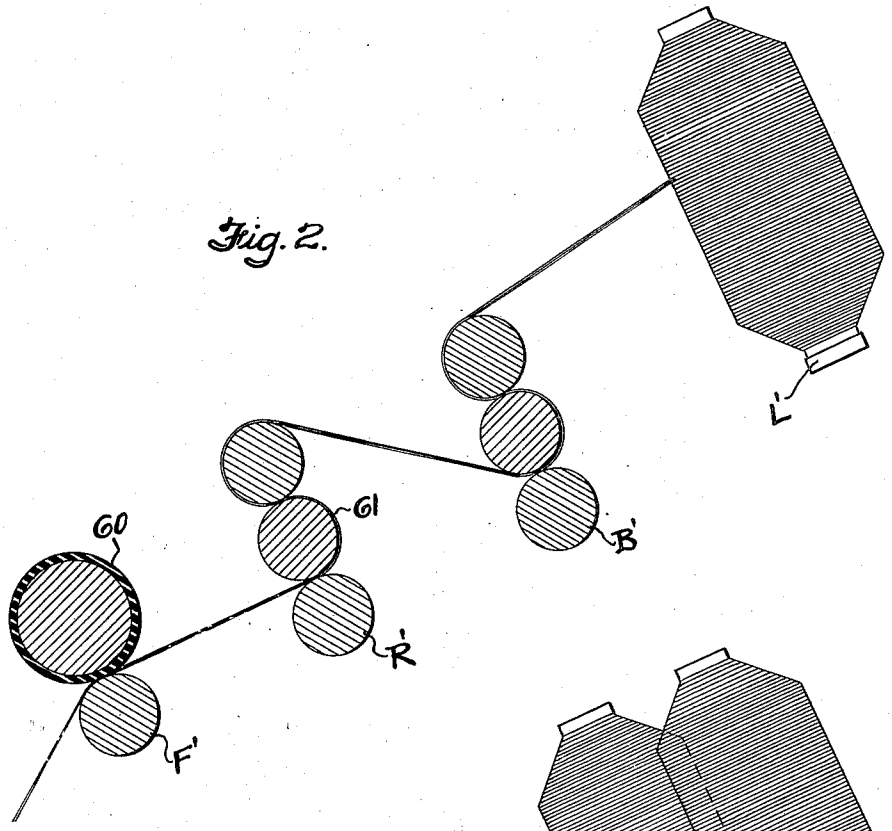
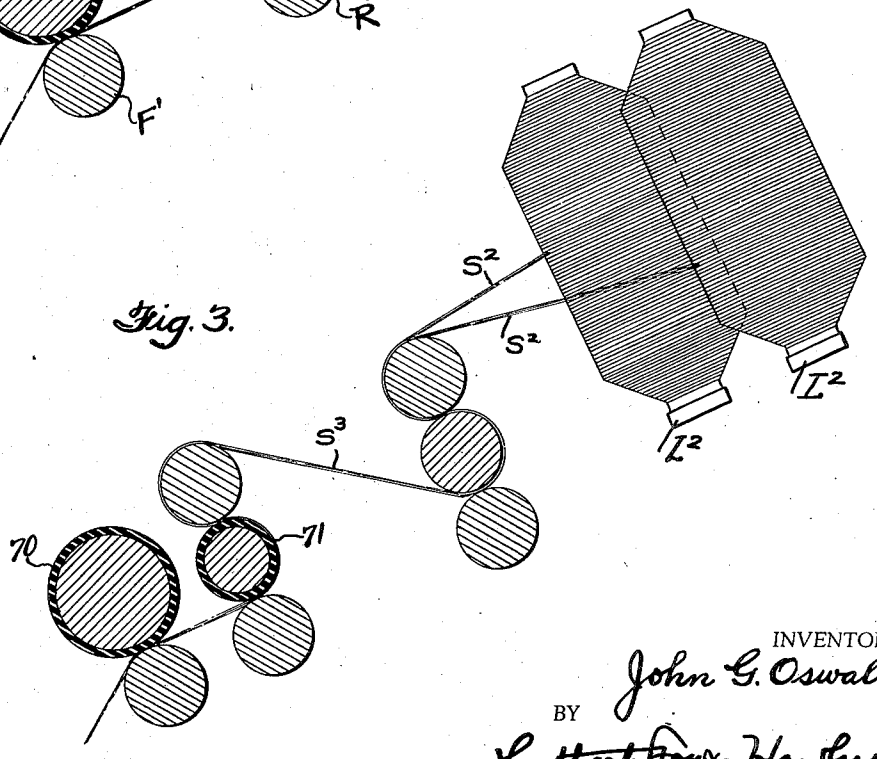


Fig. 3.



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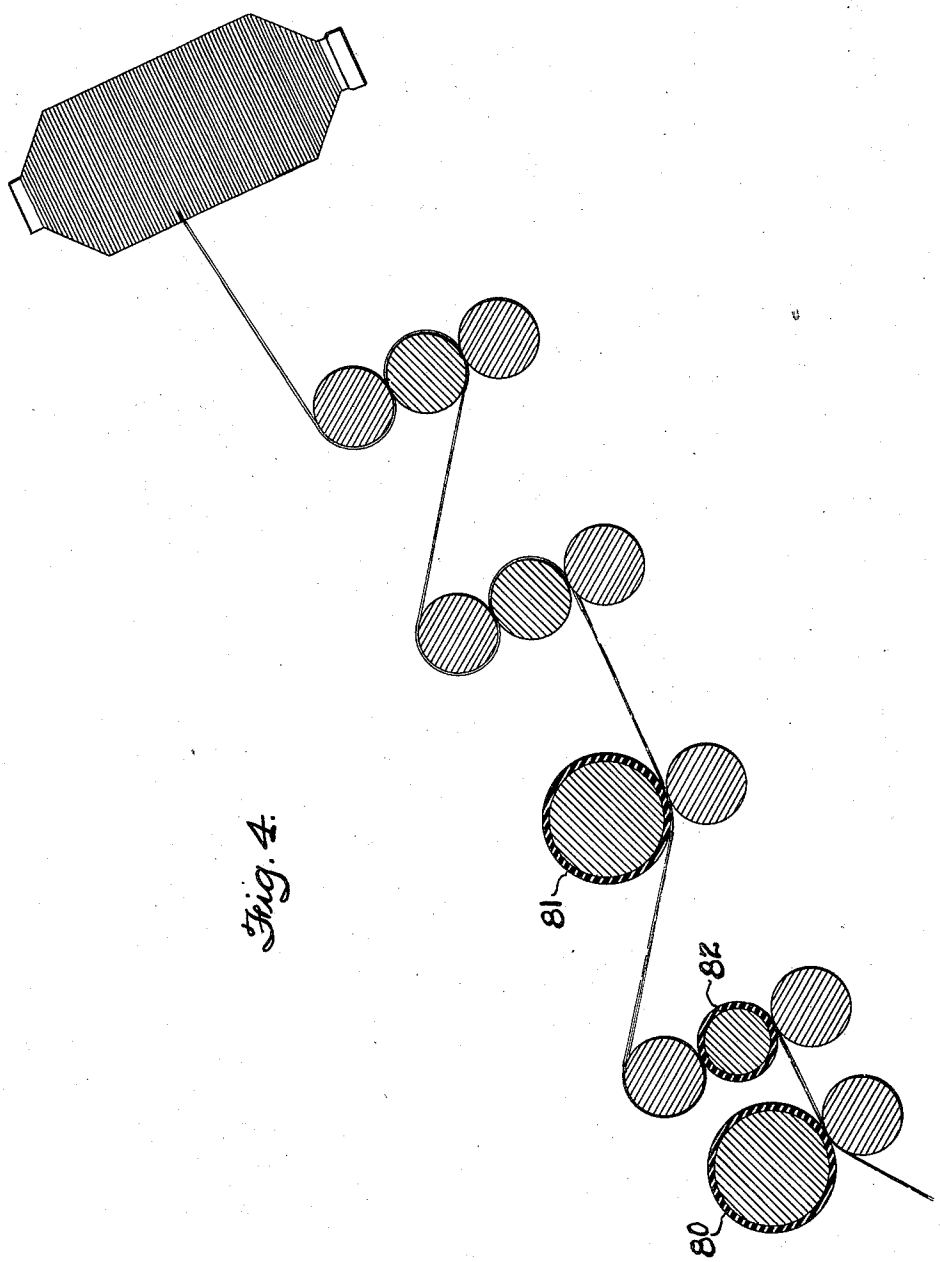


Fig. 4.

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DRAWING MECHANISM FOR SUBSTANTIALLY ELONGATED FILAMENTS

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Application October 21, 1935, Serial No. 46,011

4 Claims. (Cl. 19—130)

This invention relates to the production of yarn from continuous or substantially elongated filaments, such as real or artificial silk or other similar products, and is a continuation in part of the prior application of John G. Oswald and George W. Marsden, Serial No. 679,486, filed July 8, 1933.

It has been found that such filaments in either a continuous or a substantially elongated state are not well suited for the production of certain kinds of yarn and it is often desirable to break up the continuous or substantially elongated filaments into relatively short lengths corresponding approximately to the usual length of other associated fibers such as wool or cotton.

In one method previously proposed for accomplishing this result, a sliver of parallel continuous filaments was first produced by assembling a relatively large number of such continuous filaments in parallel relation, after which the assembled filaments were broken up into relatively short pieces while retaining their previous parallel relation as in the initial sliver. The resulting sliver was then directly drawn and spun, avoiding the necessity of performing a large number of previously required intermediate operations such as carding, combing and gilling.

When an attempt was made to practice the method above outlined by the use of the usual drawing mechanism then available, the results were found quite unsatisfactory for the reason that no uniform length of broken filament was produced but the length of the pieces of broken filament was entirely irregular and varied between very wide limits.

It is the general object of my present invention to provide improved drawing mechanism for carrying out the method or process above outlined, by the use of which improved mechanism a substantial uniformity in the length of the broken filaments is attained.

To the accomplishment of this object, I have provided improvements in the drawing mechanism previously known and used for such purposes, which improvements will be hereinafter described and more particularly pointed out in the appended claims.

While my improved drawing mechanism is of substantial value when used directly on a sliver of continuous filaments as previously proposed, I have found that it is of even greater value when used in combination with preliminary drawing apparatus by which the continuous filaments are first transformed into a sliver of substantially elongated but discontinuous filaments, which are thereafter broken up into relatively short and substantially uniform lengths by the operation of my improved drawing mechanism.

A preferred form of my invention is shown in the drawings, in which

Fig. 1 is a sectional side elevation of a drawing mechanism for a spinning or roving frame which embodies my invention;

Figs. 2 and 3 are diagrammatic side elevations showing the production and subsequent drafting of slivers of discontinuous but substantially elongated filaments, and

Fig. 4 is a diagrammatic side elevation showing a further application of the invention.

Referring particularly to Fig. 1, I have provided a set of back rolls B mounted on a bracket 10, a set of intermediate or holding rolls R mounted on a bracket 11, and a set of delivery rolls D mounted in bearings in the lower end portion of the roll stand 12.

The brackets 10 and 11 are preferably slidably mounted on the stand 12 and may be secured in adjusted positions by bolts 13. By sliding the brackets 10 and 11 to different positions on the stand 12, any desired spacing between the different sets of rolls may be secured.

Adjustment of the bracket 10 for the back rolls B is not usually necessary, but the bracket 11 for the intermediate rolls R is commonly adjusted back and forth along the stand 12 in accordance with the length of staple desired.

The lower back roll 20 is to be positively rotated. The lower back roll 20 and intermediate roll 21 are provided with gears 24 of equal size, both engaging an intermediate gear 25. Accordingly the roll 21 is driven at the same speed as the roll 20, and as the rolls are of the same diameter, the surface speed of these two rolls is also equal.

The lower front drawing roll 22 is positively driven at a substantially faster speed through gears 30, 31 and 32, so that a substantial drawing action takes place between the intermediate rolls R and the delivery rolls D.

The second intermediate roll 40 and the second or top delivery roll 41 rest upon the lower drawing rolls 21 and 22 respectively, and the rolls 40 and 41 are loaded to exert substantial downward pressure on the associated lower rolls.

The most important feature of my invention is the provision of cushion coverings 44 on the rolls 40 and 41. This covering material on the intermediate roll 40 is preferably of relatively soft rubber, either natural or synthetic, but other

suitable cushioning material may be used on the roll 41, such as leather or cork.

When the sliver S from a spool or other supply L is passed through the several sets of rolls along the path indicated in the drawings, the sliver is firmly gripped between the intermediate rolls 21 and 40 and also between the delivery rolls 22 and 41. As the delivery rolls rotate at a substantially greater surface speed than the intermediate rolls, a substantial drawing action takes place which naturally results in breaking the substantially elongated filaments of the sliver S.

The sliver, as previously stated, is made up of a large number of substantially parallel and continuous or substantially elongated filaments. With the previous mechanism which used all metal rolls, it was found that the filaments were not uniformly gripped by the rolls but that many of the filaments passed through loosely while other filaments or groups of filaments were gripped and broken. Consequently the sliver after passing through the drawing rolls was found to entirely lack uniformity in length of staple and contained many very short and very long pieces of filament in addition to some pieces of the desired length.

With my improved construction, the yielding or cushion surfaces of the rolls 40 and 41 firmly grip and hold all of the filaments, regardless of variations in size or arrangement, and a yarn is produced having the elongated filaments broken into pieces having a length of staple corresponding to the yarn which it is desired to produce. This length of staple may be widely varied by shifting the intermediate roll bracket 11 toward or away from the delivery rolls D.

The back rolls B act only to tension the filaments, and any other common tensioning means may be substituted therefor.

Preferably, upper rolls 50 and 51 are provided in the sets of back and intermediate rolls B and R. These upper rolls 50 and 51 may be utilized to apply weight to the middle rolls of each set and also to afford additional contact with the sliver which is thereby more firmly engaged and held.

Referring to Fig. 2, I have shown apparatus comprising back rolls B', intermediate rolls R' and front rolls F', together with a spool L'. This apparatus acts to break continuous filaments into substantially elongated pieces, seven inch lengths being found to be suitable. The upper front roll 60 is preferably provided with a cushion covering, as is common in such drawing mechanism, and the middle intermediate roll 61 may be a rubber-covered roll as previously described, but for this initial breaking operation it is usually more satisfactory to use a full set of steel rolls in the preliminary drawing mechanism, with the exception of the upper front roll 60.

In Fig. 3 I have indicated diagrammatically my improved drawing mechanism as previously described and shown in detail in Fig. 1. In this mechanism, the upper front roll 70 is preferably a cushion roll and the middle intermediate roll 71 is provided with a soft rubber covering, either natural or synthetic.

The slivers S^2 on the supply spools L^2 are assumed to be formed of substantially elongated discontinuous filaments and are assumed to be the product of the preliminary drawing apparatus shown in Fig. 2. Preferably two or more slivers S^2 from the preliminary apparatus will be assembled to form the sliver S^3, thus substantially increasing the uniformity in size of the product of the mechanism shown in Fig. 3. The sliver S^3 receives a second breaking action in the machine of Fig. 3, so that the filaments will be broken to about one-half the length of those produced from the initial breaking operation. This product possesses exceptional uniformity in length of fiber, as produced by my improved drawing mechanism previously described.

In Fig. 4 I have indicated diagrammatically a continuous drawing mechanism by which the two steps indicated in Figs. 2 and 3 may be performed as a continuous process. Cushion rolls 80 and 81 and a rubber covered roll 82 are provided, all as previously described. This form of apparatus reduces the required number of drawing frames for a given output but does not as readily adapt itself to the doubling of the sliver for increase in uniformity of size or weight.

The term "substantially elongated filaments" as used herein is intended to define both continuous filaments and filaments of a length at least twice that of the desired length of staple in the finished product.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:—

1. Mechanism for drawing and breaking a sliver of substantially elongated filaments into a reduced sliver of staple fibers of shorter and substantially uniform length, comprising means for applying substantial tension to said filaments, a set of front delivery rolls, a plurality of cooperating holding rolls positioned between said tensioning means and said front delivery rolls, one holding roll and one delivery roll being positively driven, and the holding roll which engages the upper surface of said driven holding roll having a yielding rubber surface engaging said substantially elongated filaments and substantially preventing slipping thereof relative to said driven holding roll.

2. Mechanism for drawing and breaking a sliver of substantially elongated filaments into a reduced sliver of staple fibers of shorter and substantially uniform length, comprising means for applying substantial tension to said filaments, a set of front delivery rolls, a plurality of cooperating holding rolls positioned between said tensioning means and said front delivery rolls, and means to maintain a definite spacing between said holding rolls and said delivery rolls, one holding roll and one delivery roll being positively driven, and the holding roll which engages the upper surface of said driven holding roll having a yielding rubber surface engaging said substantially elongated filaments and substantially preventing slipping thereof relative to said driven holding roll, and the upper front delivery roll having a cushioned surface to likewise prevent slipping of said filaments relative to the driven front delivery roll.

3. Mechanism for drawing and breaking a sliver of substantially elongated filaments into a reduced sliver of staple fibers of shorter and substantially uniform length, comprising means for applying substantial tension to said filaments, a set of front delivery rolls, a set of three holding rolls positioned between said tensioning means and said front delivery rolls, and means to maintain a definite spacing between said holding rolls and said delivery rolls, one roll of each set being positively driven, and the middle roll of the three holding rolls having a yielding rubber surface en-

gaging said substantially elongated filaments and substantially preventing slipping thereof relative to said driven holding roll.

4. Mechanism for drawing and breaking a sliver of substantially elongated filaments into a reduced sliver of staple fibers of shorter and substantially uniform length, comprising means for applying substantial tension to said filaments, a set of front delivery rolls, a set of three holding rolls positioned between said tensioning means and said front delivery rolls, and means to maintain a definite spacing between said holding rolls and said delivery rolls, one roll of each set being positively driven, and the middle roll of the three holding rolls having a yielding rubber surface engaging said substantially elongated filaments and substantially preventing slipping thereof relative to said driven holding roll, and the upper front delivery roll having a cushioned surface to likewise prevent slipping of said filaments relative to the driven front delivery roll.

JOHN G. OSWALD.