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METHOD AND APPARATUS FOR THE PRODUCTION OF BROKEN FILAMENT YARN

Filed March 21, 1939

3 Sheets-Sheet 1

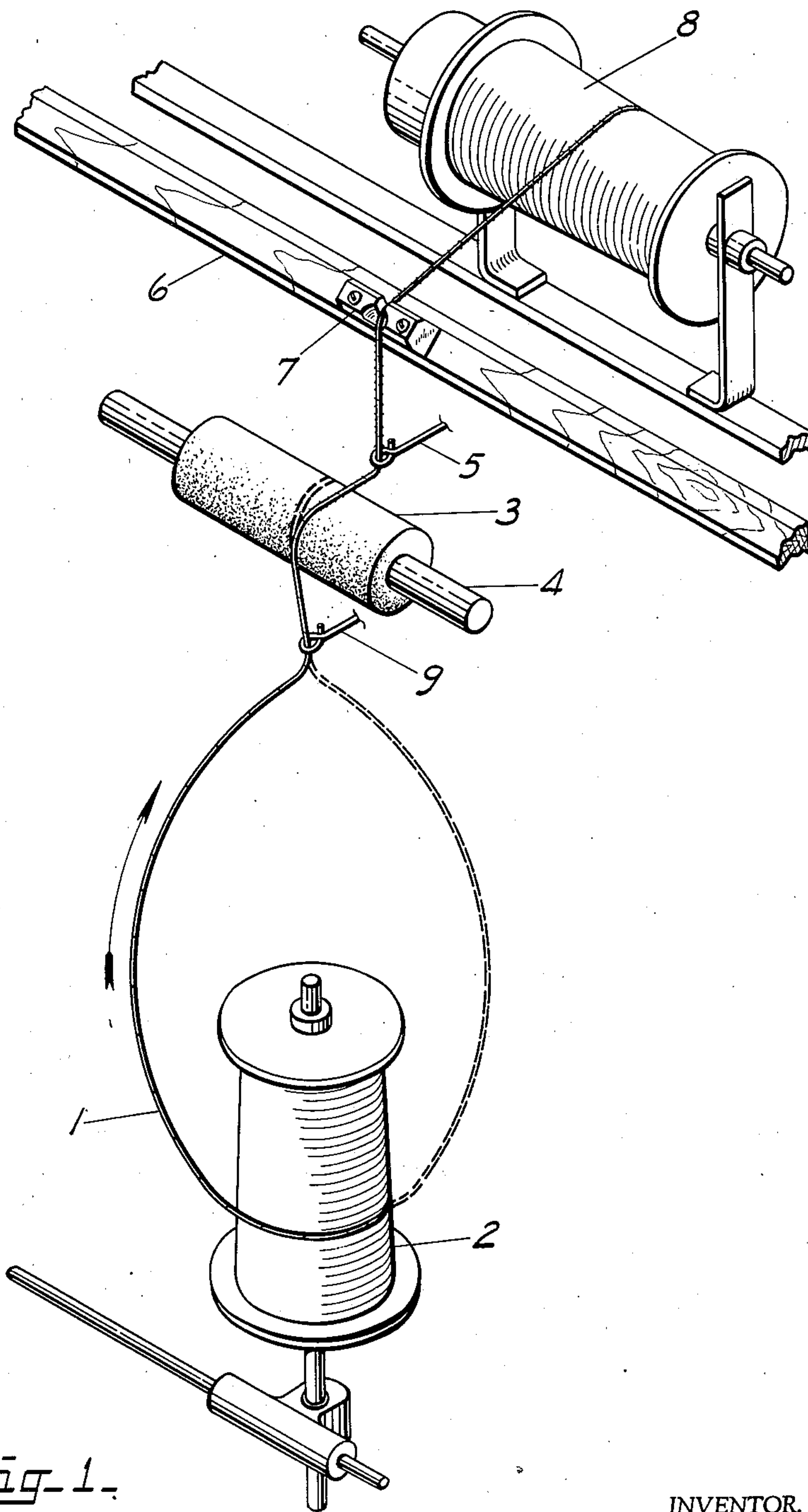


Fig. 1.

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3 Sheets-Sheet 2

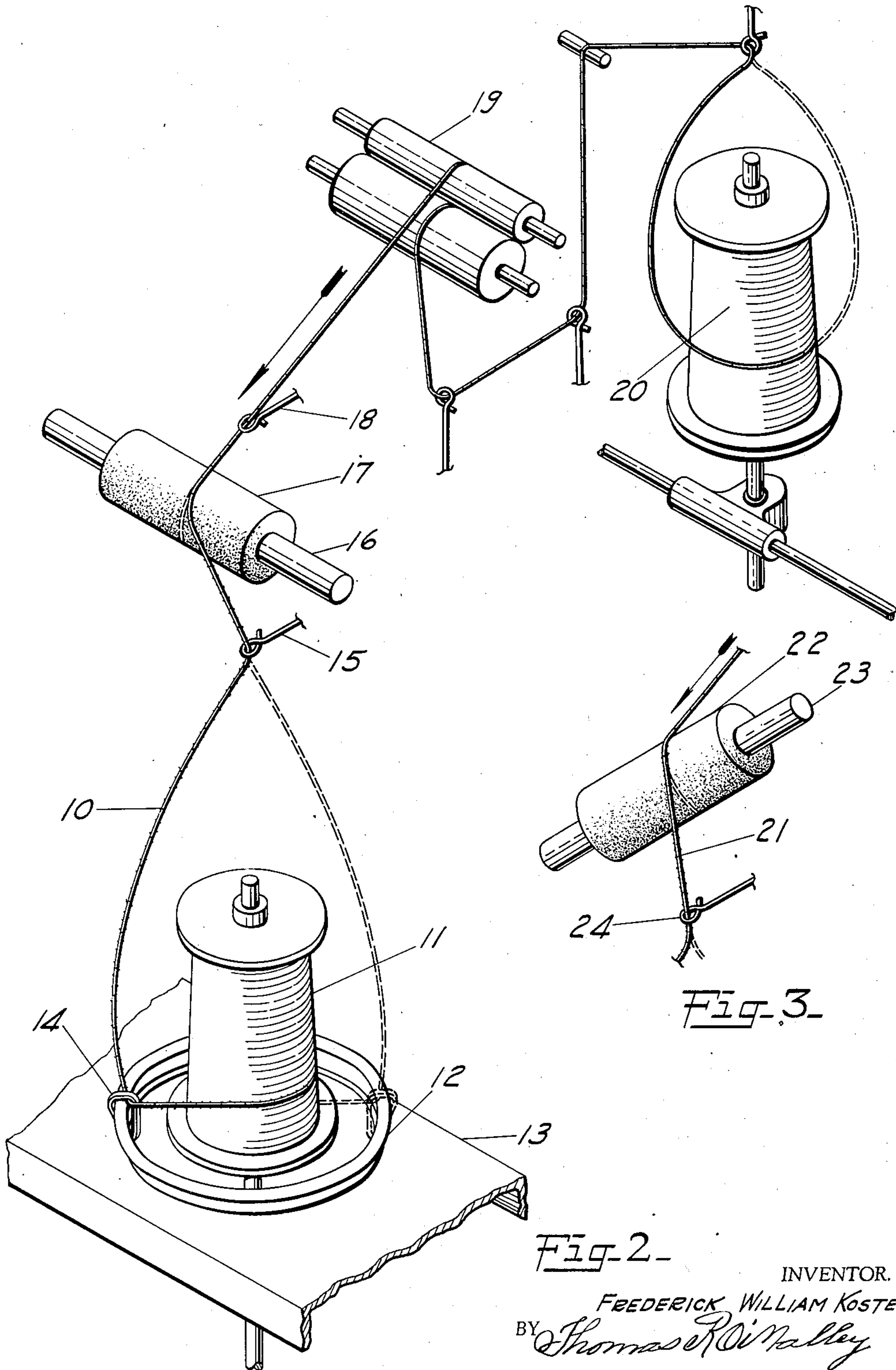


Fig-2-

Fig-3-

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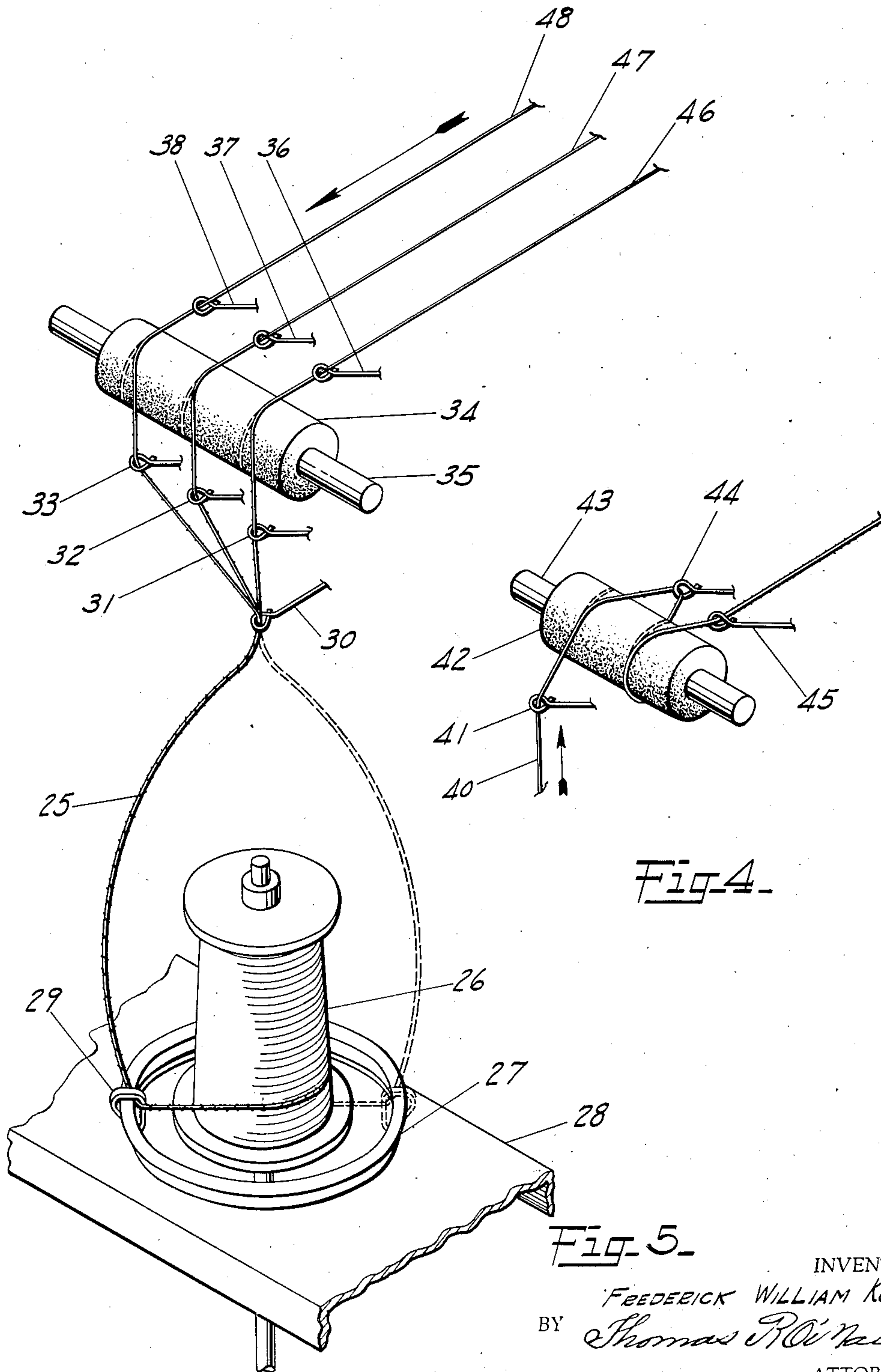


Fig-5-

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## UNITED STATES PATENT OFFICE

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## METHOD AND APPARATUS FOR THE PRODUCTION OF BROKEN FILAMENT YARN

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16 Claims. (Cl. 57—2)

This invention relates to improvements in methods and apparatus for the production of broken filament yarn.

The invention has for its principal object to provide a simple method and apparatus for the production of broken filament yarn from yarn comprising continuous filaments.

Other objects and advantages of the invention will be apparent from the following description and accompanying drawings which show forms of apparatus suitable for carrying out the invention.

In the drawings

Figure 1 is a view of a form of apparatus for carrying out the invention applied to an up twister.

Figure 2 is a view of a form of apparatus for carrying out the invention applied to a down twister.

Figure 3 is a view of a modification of the form of apparatus for carrying out the invention shown in Figures 1 and 2.

Figure 4 is a view of a modification of the form of apparatus shown in Figures 1, 2, and 3, wherein the yarn may be subjected to successive cutting or breaking operations.

Figure 5 is a view of a modification of the form of apparatus shown in Figure 2, wherein several yarns may be subjected to a cutting or breaking operation and then plied together.

In accordance with the present invention, yarn comprising continuous filaments is passed over a freely revolvable abrasive means having an abrasive surface. Filaments of the yarn engage in the abrasive surface and cause it to revolve. The yarn tends to travel around with the abrasive means in a direction lying in a plane at right angles to the axis of the abrasive means as indicated by the dotted lines in the drawings.

The peripheral speed of the abrasive means is the same as the rate of travel of the yarn. The yarn is withdrawn from the abrasive means in a lateral direction extending at an angle to the path of travel of the yarn on the abrasive means causing certain filaments to be cut or broken. This lateral direction lies in a plane disposed at an angle, less than a right angle, to the axis of the abrasive means. The extent of cutting or breaking of the filaments and the appearance of the resulting yarn depend upon the angle at which the yarn is withdrawn. Accordingly, means are provided whereby this angle may be varied so that yarns of different character may be produced.

While the invention is shown and described as

applied to twisting machines it is to be understood that the invention may be used with any type of apparatus wherein yarn travels between two points.

The invention is shown in Figure 1 as applied to an up twister. In this apparatus reference character 1 indicates yarn comprising continuous filaments being withdrawn from the revolving supply bobbin 2 and traveling to the driven take-up bobbin 3. The traversing guide rail 6 and the guide 7 direct the yarn onto the take-up bobbin. Reference character 3 indicates an abrasive means comprising a roller covered with an abrasive material or having some other form of cutting surface, mounted to revolve freely on the shaft 4. Yarn in traveling to the take-up bobbin passes over the roller. The lower guide means 9 directs the yarn onto the roller and the upper guide 5 withdraws the yarn from the roller. The yarn is withdrawn from the roller in a lateral direction extending at an angle to the path of travel of the yarn on the roller. Filaments of the yarn which have become engaged with the abrasive particles or irregularities on the abrasive surface are cut or broken when withdrawn. The extent of the action of the roller on the yarn is proportional to the angle at which the yarn is withdrawn and in this form of apparatus is determined by the position of the upper guide. The greater the number of filaments that are cut or broken the more hairy or wool-like the yarn will be in appearance. The position of the upper guide and therefore the angle at which the yarn is withdrawn may be readily varied by means not shown, which would be obvious, so that yarns of different character and appearance may be produced.

The invention is shown in Figure 2 applied to a down twister. Reference character 10 indicates yarn comprising continuous filaments passing from the stationary supply bobbin 20 to the take-up bobbin 11. The rate of travel of the yarn is determined by the feed rollers 19. The ring traveler 14 arranged on the ring twister 12 carried by the traverse member 13 cooperates with the take-up bobbin to impart a twist to the yarn. The traveling yarn passes over the abrasive means 17 comprising a roller, having an abrasive surface, mounted to revolve freely on the shaft 16. The yarn is directed onto the roller by the upper guide 18 and is withdrawn by the lower guide 15. The lower guide is so positioned that the yarn is withdrawn from the abrasive roller in a lateral direction extending at an angle to the path of travel of the yarn on



the roller. The position of the lower guide may be varied so as to change the angle at which the yarn is withdrawn.

A modification of the abrasive means shown in Figures 1 and 2 of the drawings is shown in Figure 3. The abrasive means is the same as that used in the other devices and comprises the roller 22 having an abrasive surface and mounted to freely revolve on the shaft 23. However the axis of the roller is disposed at an angle to the path of the yarn 21 traveling from the roller so that the yarn is withdrawn by the guide 24 in a direction extending at an angle to the direction of its path of travel on the roller. Filaments of the yarn on being withdrawn from the roller are cut or broken the same as in the other forms of the invention. The angle at which the axis of the roller is disposed may be varied by means not shown, but which would also be obvious, so that the extent of cutting or breaking the filaments may be changed and different types of yarn may be produced.

A further modification of the abrasive means is shown in Figure 4. This abrasive means is the same as that shown in the other figures and comprises the abrasive roller 42 mounted to freely revolve on the shaft 43. However, in this device means are provided whereby the yarn 40, comprising continuous filaments, may be subjected to a succession of operations. The yarn is directed onto the abrasive roller by the lower guide 41 and is withdrawn from the roller by the upper guide 44 in a lateral direction extending at an angle to the path of travel of the yarn on the roller. The yarn is directed back onto the roller and is again withdrawn by means of the other upper guide 45 in a lateral direction extending at an angle to the path of travel of the yarn on the roller. In this way the yarn is subjected to a succession of abrading operations in which filaments are cut or broken. The position of each of the upper guides may be varied so as to change the angles at which the yarn is withdrawn.

In Figure 5 is shown a modification of the form of apparatus shown in Figure 2. In this form a plurality of yarns 46, 47, 48, comprising continuous filaments, are directed onto the abrasive roller 34 by means of the upper guides 36, 37, and 38. The roller is mounted to freely revolve on the shaft 35. The yarns are withdrawn from the roller in a lateral direction extending at an angle to the direction of their paths of travel on the roller by means of the lower guides 31, 32, and 33. The position of the lower guides may be varied so as to change the angles at which the yarns are withdrawn. The yarns are directed by the guide 30 to the take-up bobbin 26. The ring traveler 29 arranged on the ring twister 27 carried by the traverse member 28 causes the yarns to be plied together.

While preferred embodiments of the invention have been shown, it is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined by the appended claims.

What I claim is:

1. An apparatus for producing broken filament yarn comprising a revolvable abrasive roller, means for directing a traveling yarn onto the roller and means for withdrawing the yarn from the roller in a lateral direction extending at an angle to the path of travel of the yarn on the roller.

2. An apparatus for producing broken fila-

ment yarn comprising a freely revolvable abrasive roller, means for directing a traveling yarn onto the roller and means for withdrawing the yarn from the roller in a lateral direction extending at an angle to the path of travel of the yarn on the roller.

3. An apparatus for producing broken filament yarn comprising a revolvable roller having an abrasive surface thereon, means for directing a traveling yarn onto the roller and means for withdrawing the yarn from the roller in a lateral direction extending at an angle to the path of travel of the yarn on the roller.

4. An apparatus for producing broken filament yarn comprising a revolvable abrasive roller, means for directing a traveling yarn onto the roller, means for withdrawing the yarn from the roller in a lateral direction extending at an angle to the path of travel of the yarn on the roller, said yarn withdrawal means being adjustable so as to vary the angle at which the yarn is withdrawn from the roller.

5. An apparatus for producing broken filament yarn comprising a revolvable abrasive roller, means for directing a traveling yarn onto the roller, means for withdrawing the yarn from the roller in a lateral direction extending at an angle to the path of travel of the yarn on the roller and means for varying the angle at which the yarn is withdrawn from the roller.

6. An apparatus for producing broken filament yarn comprising an abrasive member, means for directing a traveling yarn onto the member and means for withdrawing the yarn from the member in a lateral direction extending at an angle to the path of travel of the yarn on the member.

7. An apparatus for producing broken filament yarn comprising a revolvable abrasive roller, means for passing a yarn over the roller, the axis of said roller being disposed at an angle to the path of the traveling yarn, means for directing the yarn onto the roller and means for withdrawing the yarn from the roller in a direction extending at an angle to the direction of travel of the yarn on the roller.

8. An apparatus for producing broken filament yarn comprising a revolvable abrasive roller, means for passing a yarn over the roller, the axis of said roller being disposed at an angle to the path of the traveling yarn, means for directing the yarn onto the roller and means for withdrawing the yarn from the roller in a direction extending at an angle to the direction of travel of the yarn on the roller and means for varying the angle at which the roller is disposed.

9. An apparatus for producing broken filament yarn comprising a revolvable abrasive roller, means for directing a traveling yarn onto the roller, means for withdrawing the yarn from the roller in a lateral direction extending at an angle to the path of travel of the yarn on the roller and for redirecting the yarn back onto the roller and means for again withdrawing the yarn from the roller in a lateral direction extending at an angle to the path of travel of the yarn on the roller.

10. An apparatus for producing broken filament yarn comprising a revolvable abrasive roller, means for directing a traveling yarn onto the roller, means for withdrawing the yarn from the roller in a lateral direction extending at an angle to the path of travel of the yarn on the roller and for redirecting the yarn back onto the roller and means for again withdrawing the yarn from the



roller in a lateral direction extending at an angle to the path of travel of the yarn on the roller, said yarn withdrawal means being adjustable so as to vary the angle at which the yarn is withdrawn from the roller.

5 11. An apparatus for producing broken filament yarn comprising a revolvable abrasive roller, means for directing a plurality of traveling yarns onto the roller and means for withdrawing the  
10 yarns from the roller in a lateral direction extending at an angle to the paths of travel of the yarns on the roller.

12. An apparatus for producing broken filament yarn comprising a revolvable abrasive roller,  
15 er, means for directing a plurality of traveling yarns onto the roller and means for withdrawing the yarns from the roller in a lateral direction extending at an angle to the paths of travel of the yarns on the roller, said yarn withdrawal  
20 means being adjustable so as to vary the angles at which the yarns are withdrawn from the roller.

13. An apparatus for producing broken filament yarn comprising a revolvable abrasive roller, means for directing a plurality of traveling yarns  
25 onto the roller, means for withdrawing the yarns from the roller in a lateral direction extending at an angle to the paths of travel of the yarns on the roller and means for plying the yarns together.

30 14. In a method of producing broken filament yarn, the steps of directing a traveling yarn comprising continuous filaments onto a roller having an abrasive surface, continuing the travel of the

yarn on the roller substantially in a direction lying in a plane disposed at right angles to the axis of the roller and withdrawing the yarn from the roller in a direction extending at an angle to the direction of travel of the yarn on the roller.

15. In a method of producing broken filament yarn, the steps of directing a traveling yarn comprising continuous filaments onto a roller having an abrasive surface, continuing the travel of the  
10 yarn on the roller substantially in a direction lying in a plane disposed at right angles to the axis of the roller, withdrawing the yarn from the roller in a direction extending at an angle to the direction of travel of the yarn on the roller, re-  
15 directing the yarn onto the roller and continuing the travel of the yarn on the roller substantially in a direction lying in a plane disposed at right angles to the axis of the roller and again withdrawing the yarn from the roller in a direction  
20 extending at an angle to the direction of travel of the yarn on the roller.

16. In a method of producing broken filament yarn, the steps of directing a plurality of traveling yarns comprising continuous filaments onto a roller having an abrasive surface, continuing the travel of the yarns on the roller substantially  
in a direction lying in a plane disposed at right angles to the axis of the roller, withdrawing the yarns from the roller in a direction extending at an angle to the direction of travel of the yarns  
30 on the roller and plying the yarns together.

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