United States Patent [19]

Ford et al.

[11] **3,841,076**

[45] **Oct. 15, 1974**

[54] **ROVING FEED STOP DEVICE**

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[73] Assignee: **Parks-Cramer Company,** Fitchburg, Mass.

[22] Filed: **Feb. 9, 1973**

[21] Appl. No.: **331,053**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 201,303, Nov. 23, 1971, Pat. No. 3,726,072.

[52] **U.S. Cl.** **57/83,** 57/87

[51] **Int. Cl.** **D01h 13/16**

[58] **Field of Search** ..... 57/34 R, 78, 80, 81, 83, 57/84, 86, 87, 156

[56] **References Cited**

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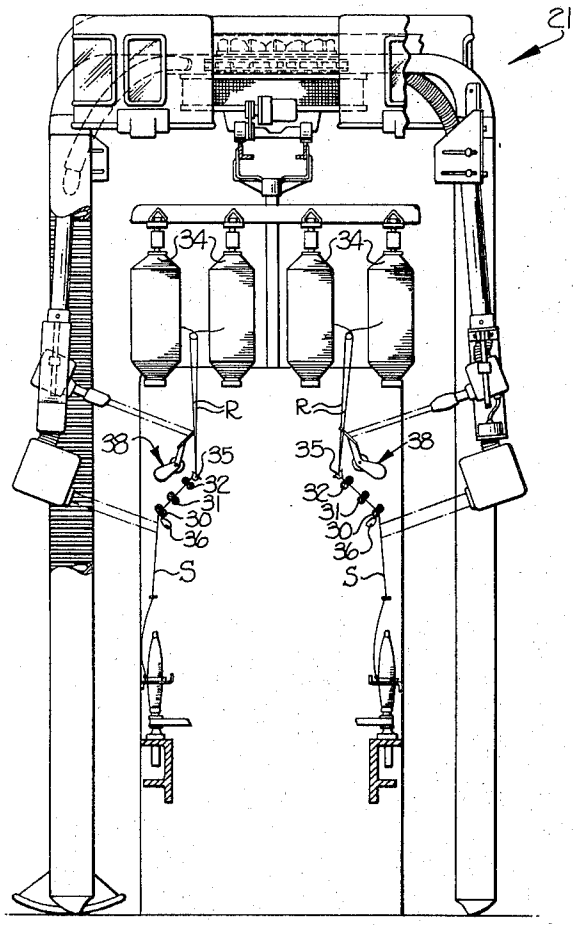
Primary Examiner—John Petrakes

Attorney, Agent, or Firm—Parrott, Bell, Seltzer, Park & Gibson

[57] **ABSTRACT**

Normal feeding of a supply strand of roving into a drafting system of a textile yarn forming machine, for delivery as attenuated yarn, is interrupted by movement of a roving feed stop device from a first position withdrawn from engagement with the supply strand to a second position in which the supply strand is engaged between converging surfaces and restrained against movement into the drafting system.

5 Claims, 9 Drawing Figures



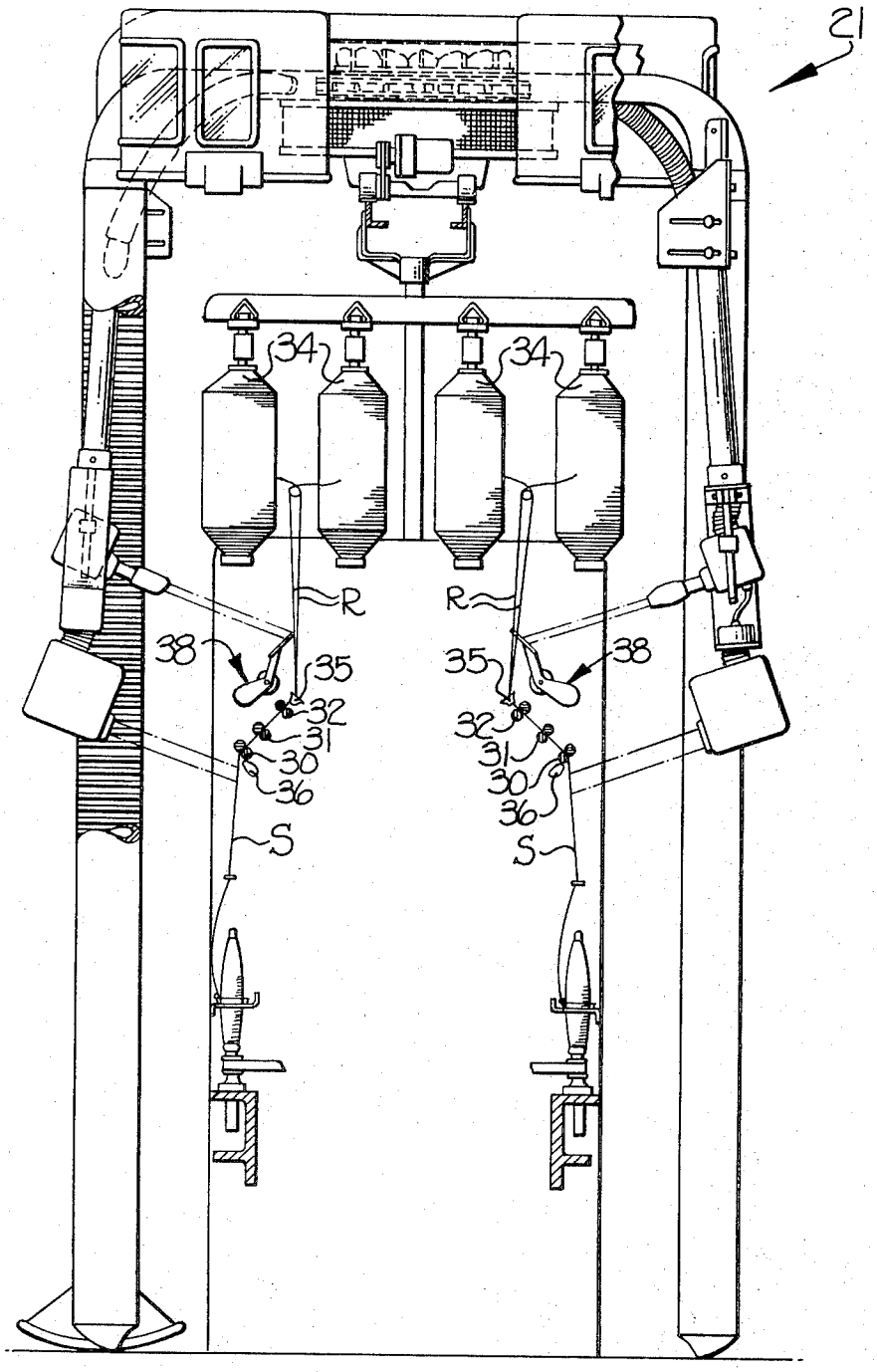


Fig-1

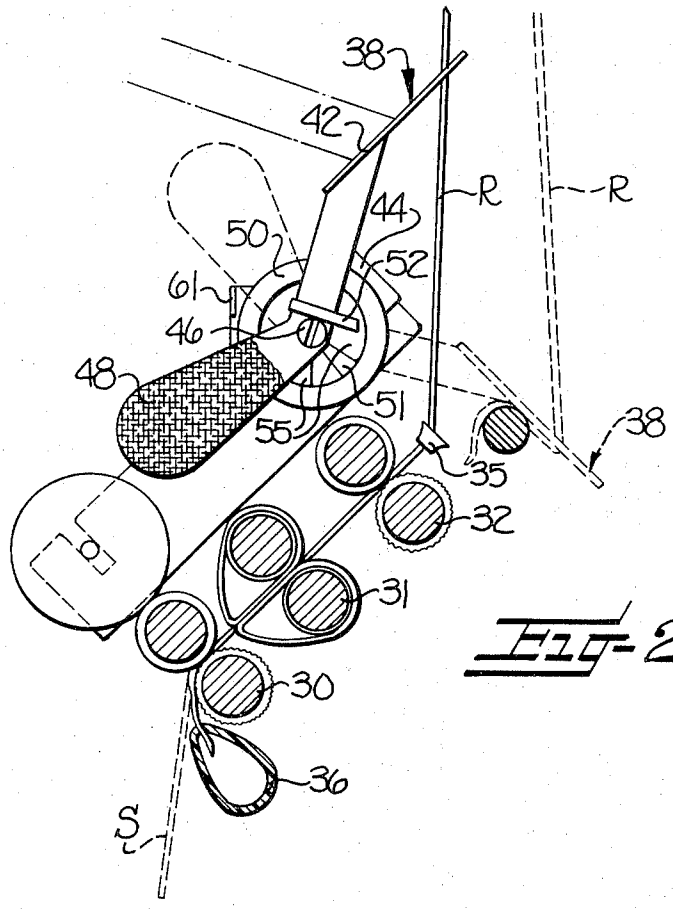


Fig-2

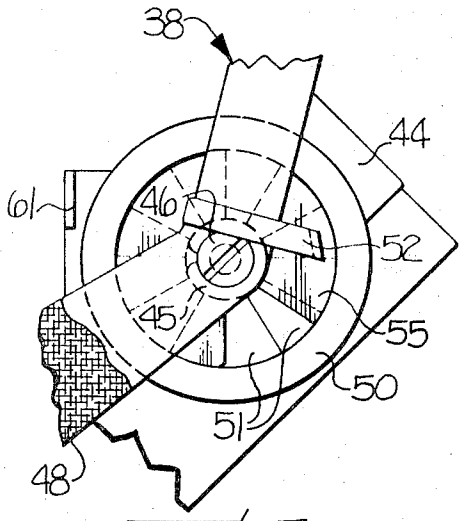


Fig-3

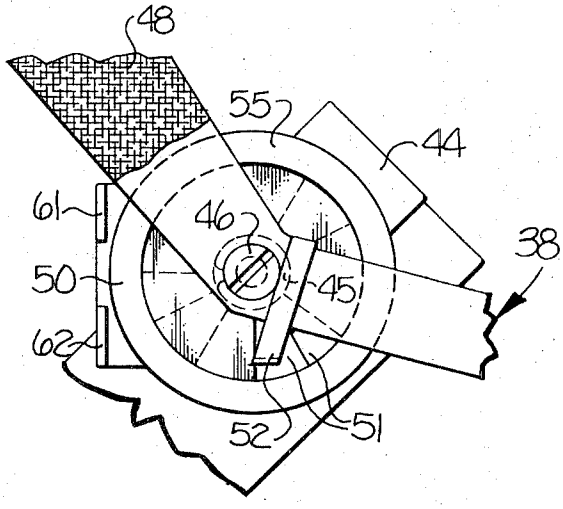


Fig-4

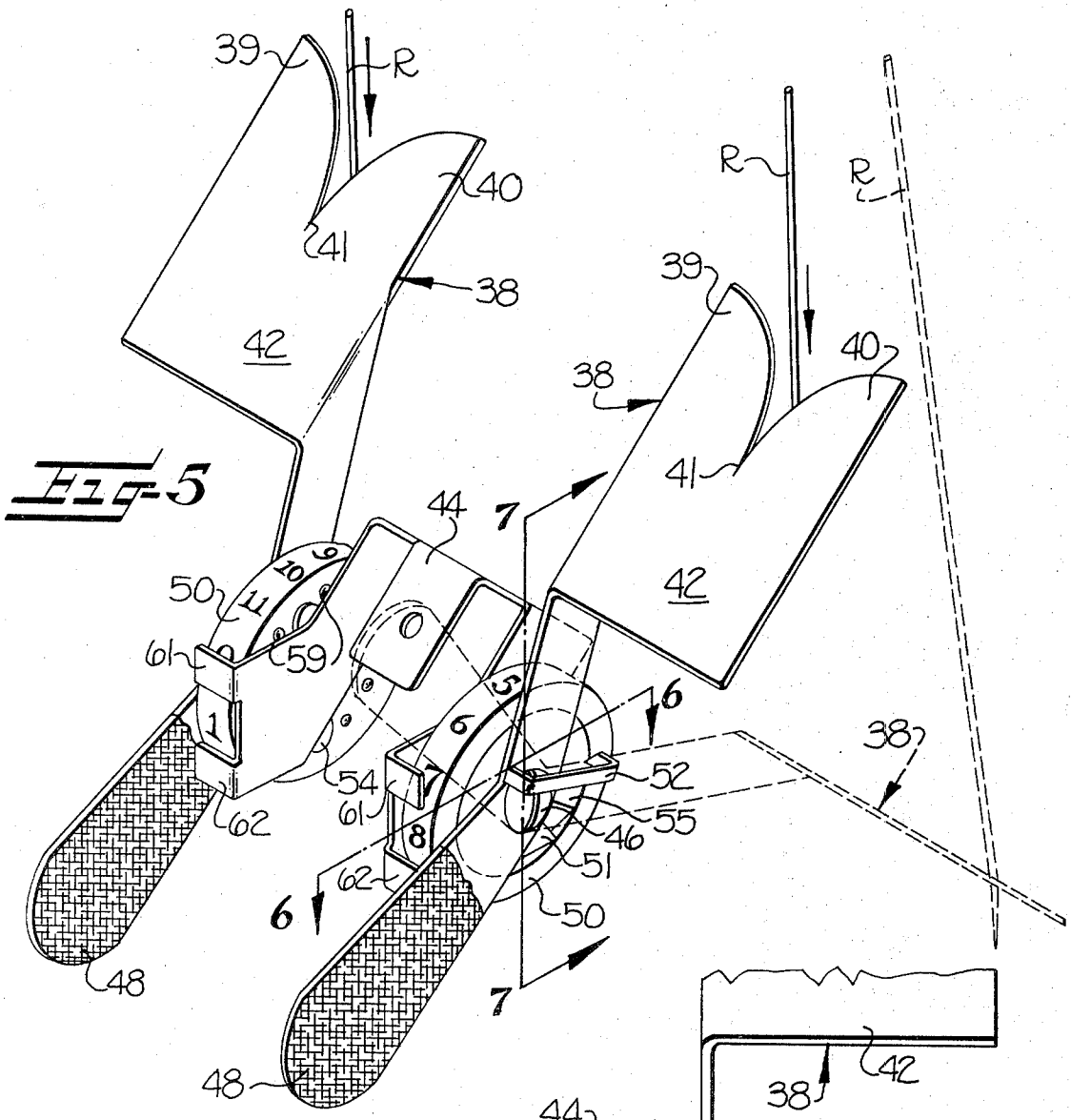


Fig-5

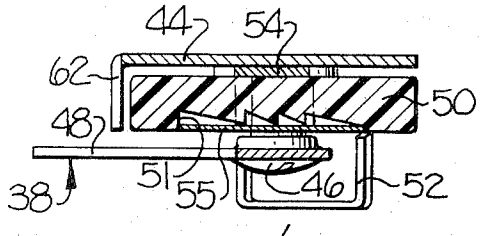


Fig-6

Fig-7

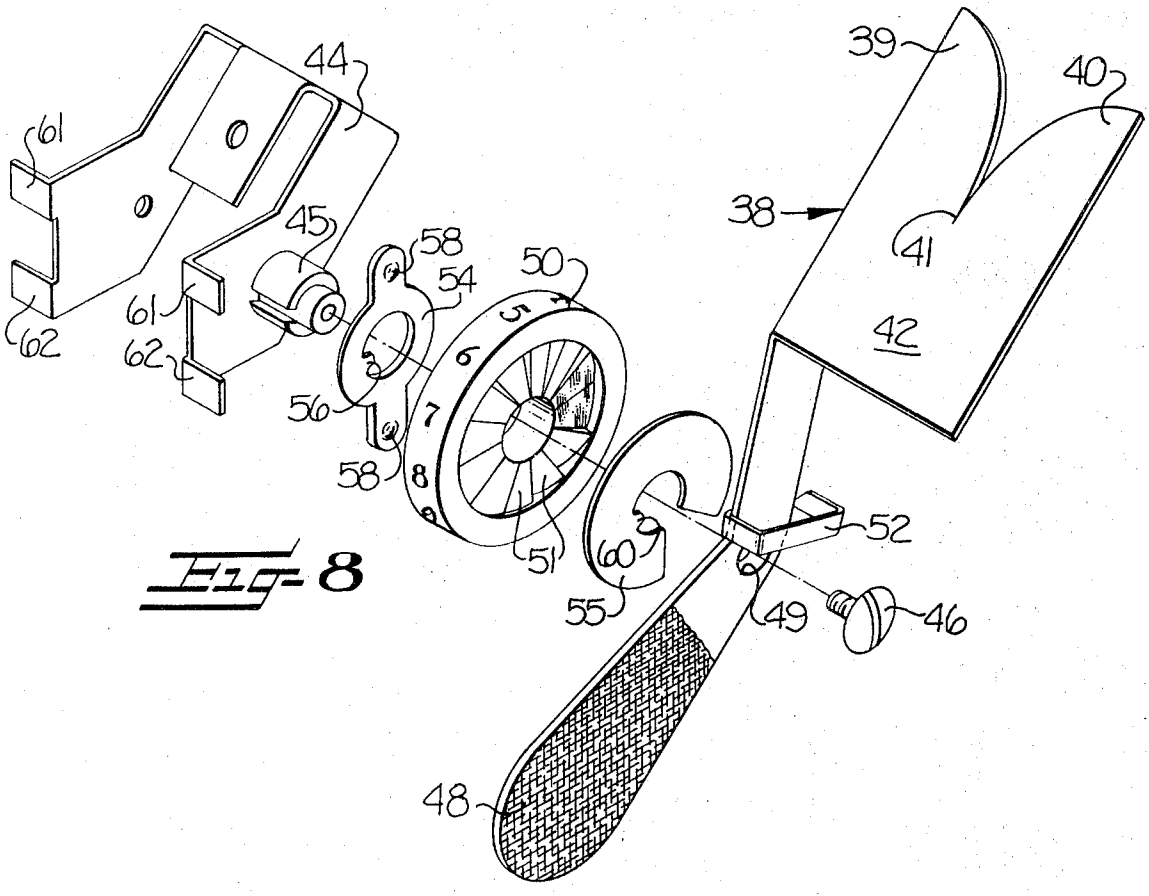

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Fig- 8

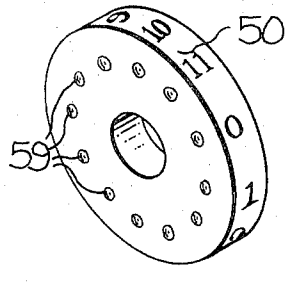

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Fig- 9

ROVING FEED STOP DEVICE

This application is a continuation-in-part of copending application Ser. No. 201,303 filed Nov. 23, 1971, and now U.S. Pat. No. 3,726,072.

The aforementioned U.S. Patent makes reference to prior efforts toward optimizing the machines and methods involved in forming textile yarns and relates to certain further improvements. Additionally, the aforementioned U.S. Patent discloses a significant advance which includes, among others, the steps of monitoring breakage of attenuated strands issuing from drafting systems, responding to monitored breakage by moving a strand interrupting member from a first position to a second position, entrapping a roving strand and interrupting passage thereof into the drafting system, and identifiably accumulating occurrences of roving strand interruption over an interval of time.

While the disclosure of the aforementioned U.S. patent (which is hereby incorporated by reference into this disclosure) teaches a novel combination in which monitoring is preferably accomplished by a detector moving with a traveling pneumatic cleaner and actuation of a roving feed stop device is preferably accomplished by impingement of air thereupon, further consideration of this combination has suggested the adaptability of elements of the combination to aid reallocation of more traditional work assignments and to take advantage of still other improvements which have been made in the effort heretofore expended toward optimizing textile processes. In particular, certain textile mills follow a practice of operating spinning rooms without "spinners," that is operators to reinstitute production (called "piecing-up") at a drafting system whenever there is a break in the attenuated strand issuing from the drafting system. Broken strands are "pieced-up" only when the frames are doffed. However, to reduce waste and prevent damage to drafting systems which will result if strands "lap-up" around drafting rolls and are left unattended for extended periods, such mills assign an operator to "break-back" the roving strands where ends are down and tie the loose strands to a part of the creel structure to prevent broken back strands from tangling with adjacent strands. This practice has been made more practical by the development of power driven carts for transporting operators about a spinning room. An operator assigned to "breaking-back" the roving strands at drafting systems where attenuated strands have broken is able to monitor many more spinning stations by riding on such a power driven cart than by walking. When the teachings of the aforementioned U.S. patent are considered with particular reference to operator assignments of this type, it becomes apparent that the roving feed stop device disclosed therein has benefits and advantages independent of its utility in the combination. The force applied may as well be from an operator as from the impingement of a flowing stream of air.

With the above discussion in mind, it is an object of this invention to accomplish the interruption of delivery of roving strands into the drafting systems of textile yarn forming machines. Through interrupting delivery of the supply strands, lap-ups are reduced, vacuum end collection waste is reduced, and both improved quality and greater efficiency may result. In the embodiment disclosed, interruption of supply strands occurs by entrapment of the strand between converging surfaces of

a roving feed stop device mounted adjacent the drafting system of textile yarn forming machine and operable either manually by an operator or automatically in response to a detector device.

Some of the objects and advantages of the invention having been stated, others will appear as the description proceeds, when taken in connection with the accompanying drawings, in which

FIG. **1** is an end elevation view, partially in section an partially broken away, of the combination of the present invention;

FIG. **2** is an enlarged elevation view of a portion of the apparatus of FIG. **1**, particularly illustrating a roving feed stop member in accordance with this invention;

FIG. **3** is an enlarged elevation view of a portion of the structure of FIG. **2**;

FIG. **4** is a view similar to FIG. **3**, showing a roving feed stop member as moved to the position indicated in phantom lines in FIG. **2**;

FIG. **5** is a perspective view of a pair of roving feed stop members in accordance with this invention and as incorporated in the structure of FIGS. **1** through **4**;

FIG. **6** is a plan view, partially in section, taken generally along the line **6—6** in FIG. **5**;

FIG. **7** is an elevation view, partially in section, taken generally along the line **7—7** in FIG. **5**;

FIG. **8** is an exploded perspective view of elements of the arrangement illustrated in FIG. **5**;

FIG. **9** is a perspective view of one component of the apparatus illustrated in FIG. **8**;

The apparatus and method of this invention will be described hereinafter with particular reference to the above-identified drawings. At the outset, however, it is to be understood that the drawings and the following description are directed to a preferred embodiment for the present invention and are not to be considered as limiting the applicability of this invention. It is contemplated that the benefits and advantages of this invention may be realized through use of apparatus and methods which may differ to greater to lesser degrees from the specific preferred embodiment disclosed herein.

In the disclosure which follows, reference will be had to one side of the textile machine **21.** It is to be understood that description of this invention in this context is intended only for purposes of simplifying this disclosure, as it is contemplated that both sides of the textile machine may be serviced simultaneously in accordance with the teachings of this invention.

As is generally known to persons skilled in the textile arts, the textile machine **21** includes a plurality of drafting systems arranged in series along the machine. Typically, and as illustrated, such drafting systems include arrangements of paired rolls **30, 31, 32** through which textile material passes to be drafted or attenuated. Each of the drafting systems normally receives at least one corresponding supply strand or roving R. While this invention is illustrated in connection with single roving drafting systems, it is contemplated as being equally applicable to double or multiple roving sytems. Conventionally, packages **34** of prepared roving are suspended in a creel section of the textile machine **21** and strands are led from respective ones of the packages **34** downwardly to be passed through trumpets **35** and introduced into a nip defined between the back drafting rolls **32.** On passage through the drafting sys-

tems, the textile material is delivered from the front drafting rolls **30** as an attenuated strand S. The attenuated strand has twist inserted thereinto in a generally known manner in order to form yarn. In the event of breakage of the attenuated strand issuing from the drafting systems, textile material delivered through the delivery rolls **30** will enter a vacuum end collection nozzle **36,** to be drawn into a waste collection chamber (not shown) adjacent one end of the textile machine **21.** Such vacuum end collection systems are generally known to persons familiar with textile yarn forming machines and have been the subject matter of previously granted patents.

Mounted on the textile machine **21** are a plurality of roving feed stop members generally indicated at **38** and corresponding in number to the number of drafting systems, with each of the stop members **38** being mounted on the textile machine **21** adjacent a corresponding one drafting system. The stop members **38** are mounted for independent pivoting movement between a first position withdrawn from the corresponding supply strand R (as shown in FIG. **1** and in the full line position of FIG. **2**) and a second position intersecting the supply strand (as shown in the phantom line position of FIG. **2**). The feed stop members **38** are selectively actuable between the first and second positions by imposition of forces thereon, such as by manual tapping or by impingement of flowing air thereagainst and, with such actuation, engage and restrain the corresponding supply strand so as to thereby interrupt the passage of the restrained strand into the corresponding drafting system. In the particular embodiment illustrated, each stop member **38** has roving engaging surfaces **39, 40** converging to define a cusp **41** into which the corresponding roving strand enters on movement of the stop member to the second position. In the particular form illustrated, the roving engaging surfaces **39, 40** define the back or rear edges of a stop member target portion **42** serving an additional function of receiving impingement of forces such as a stream of flowing air which actuate the feed stop member **38.**

In the particular embodiment illustrated, pairs of feed stop members **38** serving adjacent pairs of drafting systems are mounted by means of an intermediate bracket member **44** arranged to be disposed on the weighting system or roll stand of the textile machine **21.** By modification of the bracket **44,** the strand interrupting means of this invention, as provided by the stop members **38,** may be readily adapted to a range of differing yarn forming machines while maintaining substantial standardization of the strand interrupting assembly. The adjacent pair of stop members **38** (FIGS. **5–8**) are mounted for pivotal movement about respective stub shaft portions **45** extending from the bracket **44** and each penetrated by a threaded fastener such as a bolt **46.** By such a mounting arrangement, each of the stop members **38** is freely and independently pivotable between the first and second positions described hereinabove (and illustrated by full and phantom lines in FIGS. **2** and **5**). In order to accommodate movement of the stop members **38** with minimal application of effort thereto, and for other and further reasons to be described hereinafter, the stop members **38** preferably include flag portions **48** remote from the target portions **42** with a bore or hole **49** disposed medially of the length of the stop member receiving the stub shaft **45** and fastener **46.** Desirably, the weight and balancing of the stop members **38** are arranged to be such that the stop member normally will rest in the first position described hereinabove but may be overbalanced to move toward the second position by a relatively small force imposed on the target portion **42.** It is contemplated that this action of the stop members **38** may be achieved when the member is either produced from light gauge sheet metal by conventional stamping and bending processes or produced from suitable plastics by injection molding or the like.

The present invention contemplates that counter means may be mounted from the bracket **44** for cooperating with the roving feed stop members **38.** Such a counter means may incorporate a numbered wheel **50** mounted for rotation about the stub shaft portion **45.** By the provision of a toothed face **51** on one side of the numbered wheel **50** and a cooperating pawl **52** carried with the stop member **38,** the counter wheel **50** may be moved through a predetermined increment of rotation with each actuation of the corresponding feed stop member **38.** In order to govern positioning of the wheel **50** at predetermined positions and to limit the extent of such rotational motion, a detent member **54** and shield member **55** are also mounted on the stub shaft portion **45.** The detent member **54** has an inwardly projecting key **56** to lock the detent member against rotation relative to the stub shaft **45** and also has protruding detent surfaces **59** arranged to enter into dimples **59** formed in the face of the counter wheel **50** opposite the toothed face **51** (FIG. **9**). The shield member **55** has a similar inwardly projecting key member **60,** to preclude rotation of the shield member **55** relative to the stub shaft **45,** and is of less than fully annular configuration. By being of less than fully annular configuration, the shield member **5** defines a limited "window" or area of arcuate movement for engagement of the pawl **52** with the toothed face of the counter wheel **50.** The arc of engagement is coordinated with the number of dimples **59** formed in the counter wheel **50** and with the application of numerical markings to the circumferential face thereof so as to establish a predetermined number of incremental positions.

In the particular form illustrated, the counter wheel **50** has **12** incremental positions, indicated by numbers from **0** to **11.** By cooperation of the circumferential face of the counter wheel **50** with laterally projecting tabs **61, 62** on the bracket **44,** a selected one number is exposed to the view of an operator walking an aisle adjacent to textile machine **21** (FIG. **5**). Where desired, selected portions of the circumferential face of the counter wheel **50** may be given distinctive colors, such as a green color for the arcuate portion for the numerals **0** to **5,** a white portion for the numerals **6** to **9** and a red portion for the numerals **10** and **11.** Thus, an operator glancing at a drafting system location along with textile machine **21** could receive an immediate subjective impression of the general number of times that a corresponding roving feed stop member **38** had been actuated.

In connection with operation of the counter means, it is to be noted that the toothed face **51** of the counter wheel **50** is provided with a limited arcuate portion which is planar rather than toothed. This interrupted portion of the toothed face corresponds to positioning of the highest number for view by an operator. That is, as applied in the specific embodiment illustrated, rotation of the counter wheel **50** would be interrupted fol-

lowing movement of the number 11 to position to be viewed between the tabs 61, 62. By such provision, actuation of a corresponding roving feed stop member 38 for an excessive number of times does not bring about an incorrect lower number indication.

As pointed out briefly hereinabove, each of the roving feed stop members 38 includes a flag portion 48. As illustrated in FIGS. 2 through 5, the flag portion 48 is arranged to be disposed in a relatively retracted position while the roving feed stop member 38 is in the first position (solid lines in FIGS. 2 and 5). As retracted, the flat portion 48 is generally aligned with those portions of the textile machine 21 which impose weighting forces on the upper rolls of the drafting system roll pairs 30, 31, 32 (known generally as the "weighting systems"). As thus disposed, the flag portions 48 are not specifically brought into the view of an operator standing adjacent one end of the textile machine 21 and looking down the asile between adjacent machines toward the other end of the machine. However, with movement of the stop member 38 to the second position, the flag portion of 48 is disposed in an extended position (phantom lines in FIGS. 2 and 5) so as to be readily visible to an operator passing by an end of the machine 21. Thus, the flag portions 48 of the stop members 38 function to direct an operator to a drafting system at which supply strand interruption has occurred. Where such redirection of operator labor is not desirable or is unnecessary, counter balancing of the target portion 42 of the feed stop member 38 may be accomplished by a greater concentration of weight into a smaller area, rather than by the provision of a flag portion.

In the drawings and specification, there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation.

That which is claimed is:

1. In combination with a textile yarn spinning machine having a plurality of drafting systems arranged in a series for normally receiving a corresponding series of roving strands and delivering a corresponding series of attenuated strands, apparatus for stopping feeding of a roving strand to a drafting system in the event of breakage of the attenuated strand issuing therefrom, the apparatus comprising:

a plurality of roving feed stop members corresponding in number to the number of said drafting systems, each of said stop members being mounted on said spinning machine adjacent a corresponding drafting system for independent movement between a first position withdrawn from engagement with the corresponding roving strand and a second position intersecting and engaging said corresponding roving strand and further having roving engaging surfaces converging to define a cusp into which said corresponding roving strand enters on movement of said stop member to said second position, and

means operatively connected with each of said roving feed stop members and responsive to actuation thereof for identifiably accumulating occurrences of supply strand interruption over an interval of time and for thereby facilitating identification of portions of the yarn forming machine requiring corrective maintenance.

2. Apparatus according to claim 1 wherein said means responsive to actuation of said stop members comprises a plurality of individually actuable counter means corresponding in number to the number of said stop members, each of said counter means being mounted adjacent a corresponding one of said stop members and being responsive to movement thereof for indentifying an occurrence of roving strand interruption by said one stop member.

3. Apparatus according to claim 2 wherein each of said counter means comprises a counter wheel member mounted for rotation and ratchet means for rotating said counter wheel member through a predetermined arc of rotation upon each occurrence of roving strand interruption by said one stop member.

4. Apparatus according to claim 2 wherein each of said counter means comprises signaling means for indicating to an operator the relative number of occurrences of roving strand interruption accumulated over said interval of time.

5. In a combination with a textile yarn spinning machine having a pluraltiy of roving strand packages, a plurality of drafting systems arranged in a series for normally receiving a corresponding series of roving strands and delivering a corresponding series of attenuated strands, and a plurality of roving guides each mounted adjacent a corresponding one drafting system for receiving and guiding a corresponding one roving strand, said guides being the only guides penetrated by said roving strands between said packages and said drafting systems, apparatus for stopping feeding of a roving strand to a drafting system in the event of breakage of the attenuated strand issuing therefrom, the apparatus comprising:

a plurality of roving feed stop members corresponding in number to the number of said drafting systems, each of said stop members being mounted on said spinning machine adjacent a corresponding drafting system for independent movement between a first position withdrawn from engagement with the corresponding roving strand and a second position intersecting and engaging said corresponding roving strand at a point between the corresponding guide and the corresponding package and more closely adjacent said corresponding guide than said corresponding package and further having roving engaging surfaces converging to define a cusp into which said corresponding roving strand enters on movement of said stop member to said second position.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,841,076 Dated October 15, 1974

Inventor(s) Maynard Ford and Charles D. Lee, Jr.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 2, line 9, "an" second occurrence should be -- and --

Column 2, line 41 "to" (second occurrence) should be --or--

Column 4, line 28, "59" (first occurrence) should be --58--

Column 4, line 35, "5" should be --55--

Column 5, line 12, "flat" should be --flag--

Signed and sealed this 17th day of December 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

FORM PO-1050 (10-69)

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