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PROCESS FOR SEVERING FED STRANDS AND SUBSEQUENT HANDLING THEREOF

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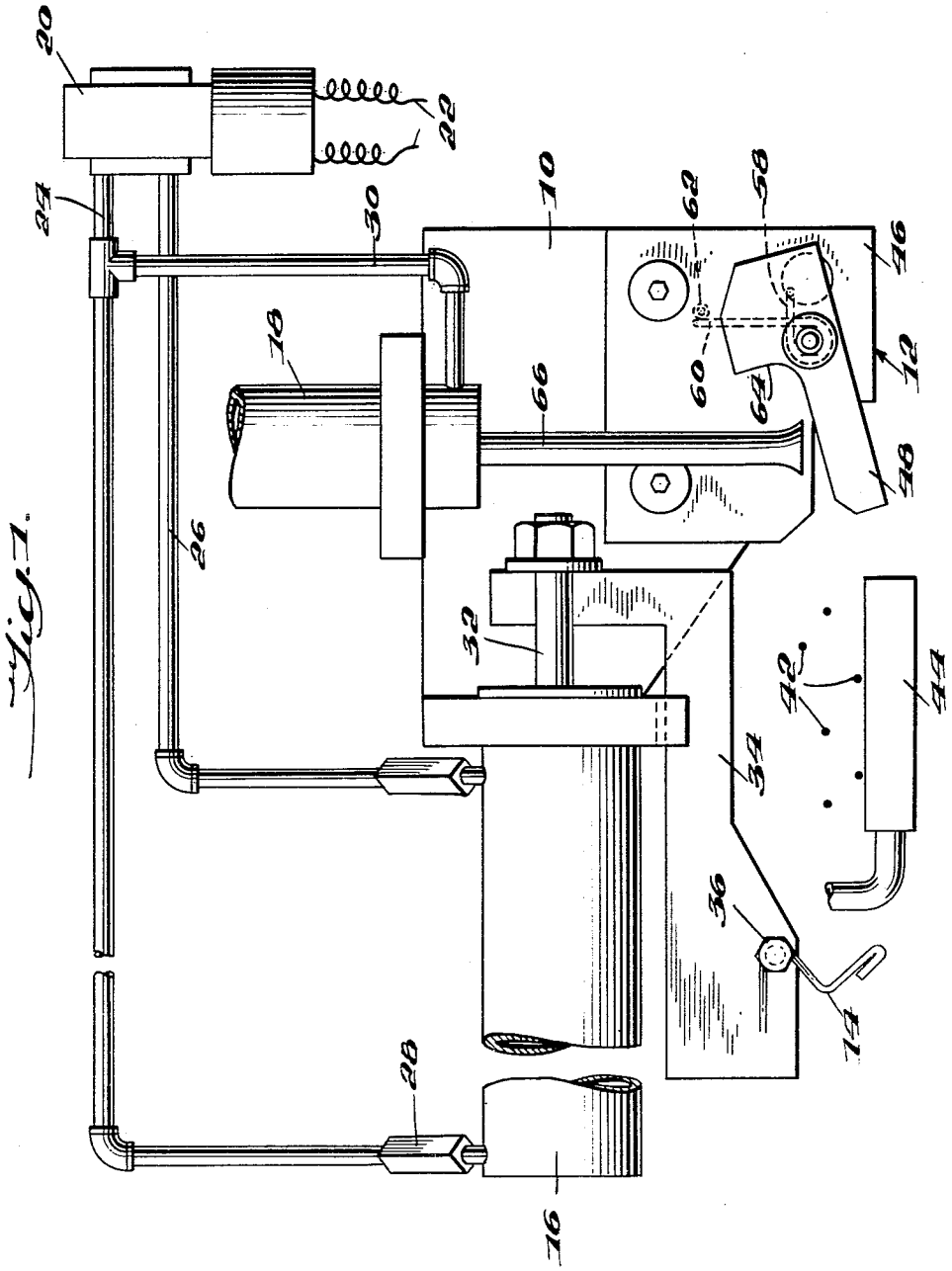


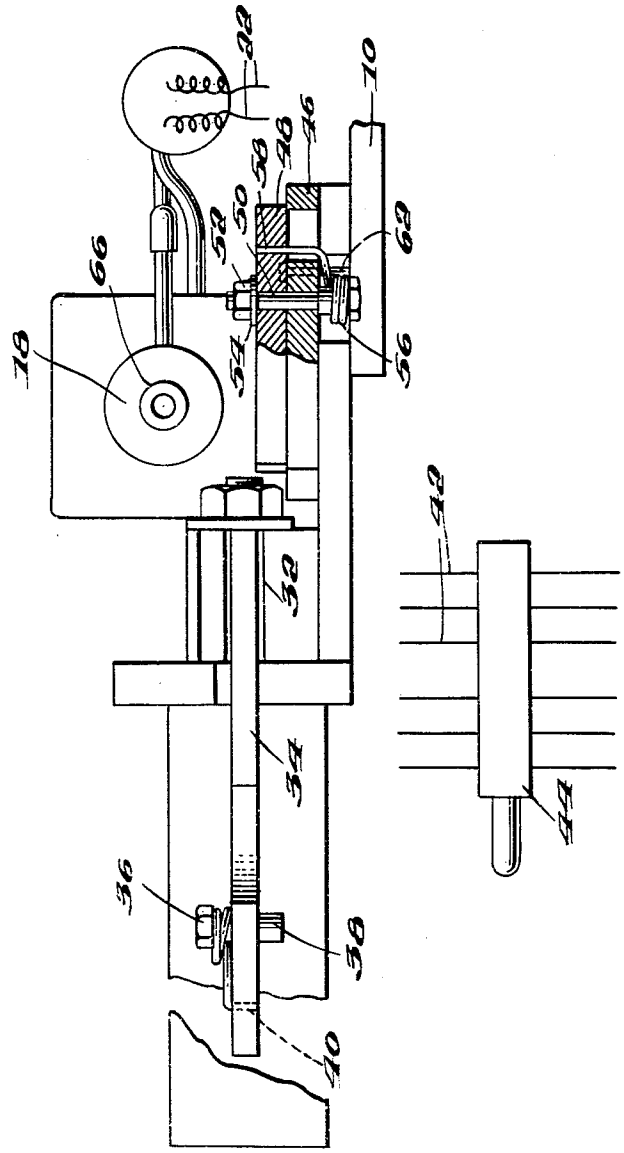
Fig. 1.

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Fig. 2.



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Fig. 3.

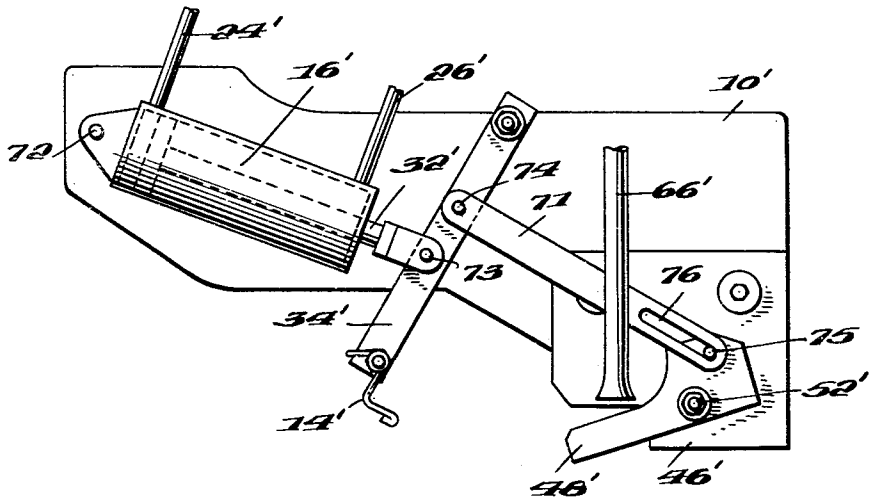
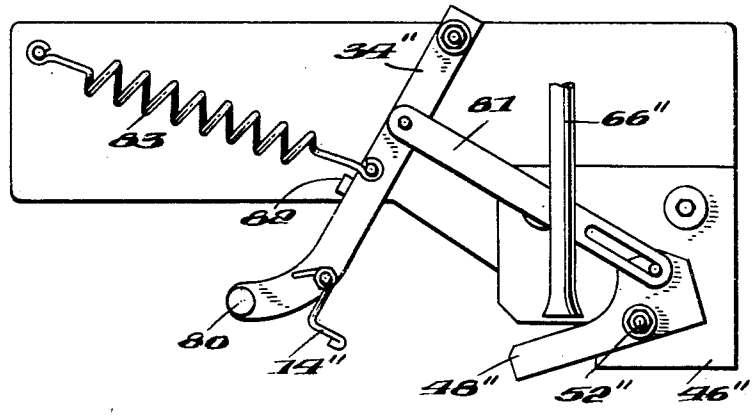


Fig. 4.



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PROCESS FOR SEVERING FED STRANDS AND SUBSEQUENT HANDLING THEREOF

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This invention relates to the handling of strands and, more particularly, to the processing of a plurality of strands advancing away from a continuously operating source.

The term "strand," as used herein, is intended to include either a single filament, a gathered plurality of such filaments, or the threads, yarns, narrow webs, and the like produced from filaments or from staple fibers.

It is well known in the textile industry that a spinning process, wherein filament-forming material is extruded from a spinneret, is normally not stopped when a defective condition arises during the handling steps which follow extrusion. Such defects are usually encountered in the form of roll wraps, breaks, or similar defects which appear in the downstream handling of the strands. Rather than interrupt the spinning process, the practice is for the operator to cut down all the strands and then introduce them to a fluid actuated aspirator of the type shown by Miller in U.S. Patent No. 2,667,964. Since it is also customary in the art to have a single operator patrol a multiplicity of spinning positions, it is obvious that a defective condition may go unnoticed for a considerable period of time with resultant damage to the process equipment and a consequent interference with orderly operating procedures. An alternative practice has been to employ sensing devices which function to detect the various defects and to actuate cut-down or stop-motion equipment thereby interrupting the downstream delivery from a given source. The extruded material is then permitted to accumulate on the floor beneath the spinning position until the operator has had a chance to remedy the sensed defect and restore the position to a normal operating condition. In such equipment, it is customary to provide a separate cutting device for each of the advancing strands.

The most important object of the present invention is to provide an improved process for cutting down and disposing of all the strands advancing from a spinning position upon occurrence of a defect in one or more of the strands.

A further object of this invention is to provide a process in which the cut-down device and aspirator are actuated simultaneously, either as an automatic or a manual response to an undesirable operating condition.

With these and other objects in view, the process of this invention involves the steps of gathering the strands into a bundle, moving the bundle laterally to a severing zone, severing the bundle and removing the severed, continuously advancing strands from the zone by suction.

Further advantages will become apparent in the following description wherein reference is made to the accompanying drawings in which:

FIGURE 1 is a plan view of automatic process equipment shown in conjunction with a plurality of advancing strands;

FIG. 2 is an elevational view of the equipment shown in FIG. 1, parts having been broken away and shown in section to reveal details of construction; and

FIGS. 3, 4 are plan views of alternate embodiments.

In FIGS. 1, 2, a cut-down apparatus has been illustrated which apparatus comprises generally a support **10**, strand-severing means **12**, a strand-gathering hook **14**, an

actuator **16** for moving the hook toward the severing means, an aspirator **18** for withdrawing severed strands and a condition responsive solenoid valve **20** by means of which actuator movement is initiated.

A pair of leads **22** couple solenoid valve **20** to a sensing device (not shown) in which an electrical circuit is closed upon the detection of an abnormal operating condition. Valve **20** admits air under pressure into one of the conduits **24**, **26**. Conduit **24** discharges into the actuator **16**, which has been illustrated as a double-acting piston-cylinder assembly, through a flow control valve **28**. Conduit **24** simultaneously feeds aspirator **18**, which may be of the type disclosed by Miller, through branch conduit **30**. Conduit **26** discharges into the other end of the assembly **16**. Hook **14** is attached to the piston rod **32** by an irregularly shaped arm **34**. Arm **34** is apertured to receive a pin **36** which extends through a coil intermediate the ends of hook **14** and through arm **34** into threaded engagement with a stud **38**. Hook **14**, which is of a suitable spring metal, has one end anchored in an opening **40** in arm **34**. A plurality of strands, indicated by the numeral **42**, is restrained by one or more fixed guides **44**, so that strands **42** pass axially through the area swept by hook **14** in its translatory movement toward severing means **12**.

The severing means **12** chosen for illustration is a plate type knife which includes a fixed plate **46** and a pivoted knife blade **48**. Blade **48** is attached to plate **46** by a pin **50** and a nut **52** which acts on a spring washer **54**. The pivoted blade **48** is biased to the open position by a coil spring **56** which has one end **58** anchored to blade **48** and its other end **60** in engagement with a pin **62** on plate **46**. Blade **48** has an abutment **64** which is within the path of travel of stud **38** upon translatory movement of the arm **34** so that blade **48** is closed against the bias of spring **56** when a bundle of strands is delivered thereto by hook **14**. For best results, the blades should be of tool steel and the cutting edges should be ground.

After the strands have been severed by blade **48**, they are picked up by and aspirated through a tube **66** of aspiration **18** to a suitable waste collection point.

In operation, therefore, energization of solenoid valve **20** by the sensing device admits air under pressure to actuator **16** and the aspirator **18** through conduit **24**. All of the strands **42**, including those in which no defect has occurred, are gathered by hook **14** and delivered as a bundle to the severing zone from which the cut strands are withdrawn by aspirator **18**. When the source of the defective strand condition has been remedied, the operator inactivates the sensing device by throwing a laming switch (not shown) which functions to hold valve **20** in the deenergized position. After string-up and the like, the spinning position is placed in automatic operation by moving the laming switch to a position in which the sensing device is in a ready condition.

The embodiment of FIG. 3 is structurally and functionally similar to that shown in FIG. 1 except for the pivotal mounting of piston-cylinder assembly **16'** and arm **34'**, the provision of link **71** and the omission of spring **56** (FIG. 2). Assembly **16'** is pivoted to support **10'** at **72** and to arm **34'** at **73**. Link **71** is pivoted to arm **34'** at **74** and receives a pin **75** on pivoted blade **48'** in a slot **76**. When fluid pressure is applied to connection **24'**, the piston of assembly **16'** swings arm **34'** toward tube **66'**. As gathered strands approach the tube inlet, the end of slot **76** engages pin **75** and pivots blade **48'** to the cutting position.

Instead of an automatic actuator, the manually operable embodiment of FIG. 4 has an extension on arm **34''** provided with an upstanding handle **80**. Arm **34''** is normally held against stop **82** by a spring **83** and is connected

to blade 48'' by a link 81 functionally identical to the link 71 (FIG. 3). The aspirator of tube 66'' can be activated either manually or in response to movement of arm 34''.

This application is a continuation-in-part of and claims only the subject matter divided from my copending application Serial No. 827,901, now U.S. Patent No. 3,090,268, filed July 17, 1959. The process claimed herein has utility in conjunction with any equipment wherein one or more strands pass axially between two process points. Each illustrated embodiment may be employed, for example, in the cold drawing process disclosed by Sharp in U.S. Patent No. 2,851,732, in which instance the cut-down apparatus is installed at a location where the bundle has been subdivided into smaller bundles.

It is apparent that many changes and modifications may be made in the disclosed cut-down process without departing from the spirit of the present invention which is accordingly intended to be limited only by the scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In the production of stranded material, the steps of: gathering a plurality of strands advancing axially from their sources into a bundle upon occurrence of a defective

downstream process condition in one or more of the strands; moving the bundle laterally to a severing zone; severing the bundle; and removing the severed, continuously advancing strands from said zone.

2. In a process which requires the continuous advance of a plurality of strands away from a strand source, the steps of: gathering the strands into a bundle and moving the bundle laterally from the normal axial path of the strands to a severing zone responsive to a defective downstream process condition in one or more of the strands; severing the bundle; and removing the severed, continuously advancing strands from said zone.

3. An automatic process comprising the steps of: advancing a plurality of strands away from a continuous production source; gathering the strands into a bundle responsive to a defective downstream condition in one or more strands; moving the bundle laterally from the normal path of advance to a cutting zone; cutting the bundle on its arrival in the zone; and removing the continuously advancing strands from the zone.

References Cited in the file of this patent

UNITED STATES PATENTS

2,424,555 Curtis ---------- July 29, 1947