Feb. 23, 1954

F. F. SUTHERLAND

2,670,154

TEXTILE APPARATUS

Filed Sept. 9, 1948

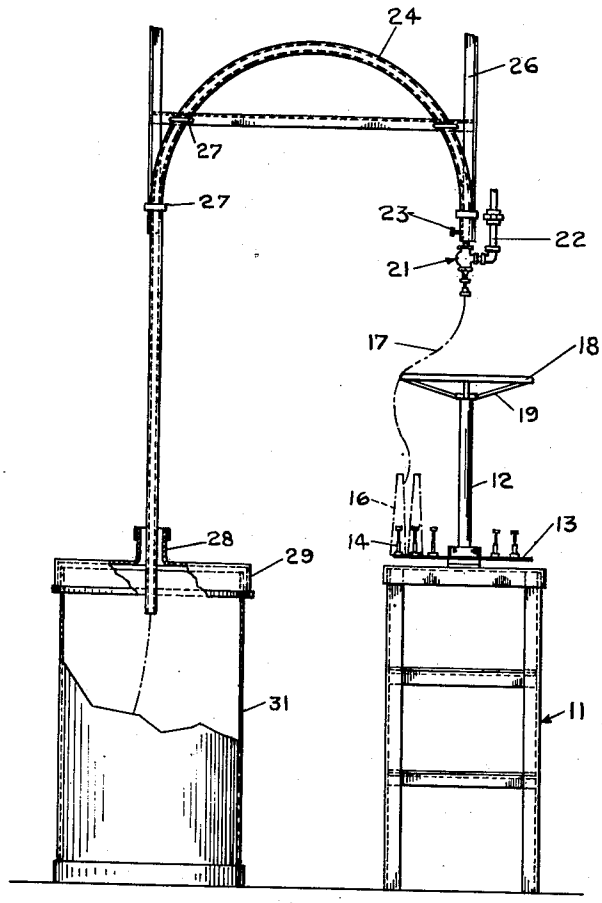


Fig. 1

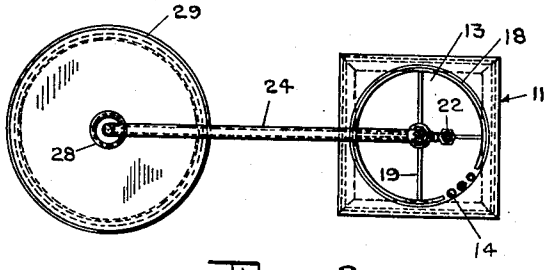


Fig. 2

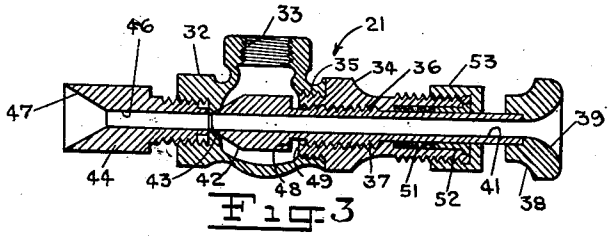


Fig. 3

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TEXTILE APPARATUS

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1 Claim. (Cl. 242—128)

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This invention relates to textile apparatus, and relates more particularly to apparatus for unwinding or cleaning yarn from a yarn package and to fluid-operated jet means employed in connection with said apparatus.

As is well known, it is often necessary to unwind the yarn from yarn packages when the yarn is soiled or damaged or when the length of yarn on the package is below a given minimum. It has hitherto been customary to carry out this unwinding operation manually or by means of motor driven unwinding apparatus which was of limited utility in that it required large amounts of labor and operated at relatively low speeds.

It is an important object of this invention to provide an apparatus for unwinding yarn from yarn packages which will be more efficient in operation and simpler in construction than apparatus hitherto employed for this purpose.

A further object of this invention is to provide an apparatus for unwinding yarn from yarn packages in which a fluid-operated jet means is employed to draw the yarn from the yarn packages.

Another object of this invention is to provide a novel fluid-operated jet means for transporting yarn.

Other objects of this invention, together with certain details of construction and combinations of parts, will be apparent from the following detailed description and claim.

In its broadest aspect this invention comprises an apparatus for unwinding yarn from yarn packages in which a fluid-operated jet means is employed to draw the yarn from the yarn packages. The apparatus of this invention may be employed for unwinding yarn from various types of yarn packages such as pirns, bobbins, spools, cakes, etc. Depending upon the fineness of the yarn, a single fluid-operated jet means will simultaneously unwind the ends from 1 to 100 or more yarn packages delivering the yarn to any suitable type of receiver such as a waste can. The speed with which the yarn is unwound will vary depending upon the fluid pressure employed, the rate of fluid flow, the fineness of the yarn and the number of ends being simultaneously handled, and may range from 100 to 3000 or more yards per minute. The fluid employed to operate the jet means will generally be air since it is the least expensive and may be used in an open system exhausting to the atmosphere. However, other fluids may be employed, if desired. Fluid pressure may range from 25 to 500 or more pounds per square inch and flow rates may range

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from 0.1 to 20 or more cubic feet per second, the particular pressure and rate of flow depending upon the fineness and number of ends of yarn being simultaneously unwound, as well as upon the speed desired.

In carrying out this invention the yarn packages may be supported in any desired manner. For example, the yarn packages may be supported on a transport holding from 25 to 100 or more packages, or on a table provided with suitable package supporting means. The yarn may pass directly from the yarn packages to the fluid-operated jet means or may pass over or through any number of suitable guides before reaching said jet means. From the fluid-operated jet means the yarn may pass directly into a suitable receiver such as a waste can or the yarn may pass through or over one or more yarn guides before reaching said receiver. It is preferred to employ conduits as yarn guides since the fluid continues to transport the yarn as it passes through said conduits. When a plurality of ends are being simultaneously unwound from a number of yarn packages each end may be individually threaded into the fluid-operated jet means, or each succeeding end may be laid over yarn passing to the jet means and will be carried into said jet means by said yarn.

This invention also comprises a novel fluid-operated jet means for transporting yarn in which the rate of fluid flow may be readily adjusted during operation to control the speed of the yarn. Means may also be provided to limit the maximum amount of fluid which may be passed through the jet means, thereby to avoid any waste of fluid and to render the operation of the jet means substantially fool-proof. In addition, the fluid-operated jet means may be constructed so that the flow of fluid therethrough may be cut off completely to permit shutting down of the apparatus in which said jet means is employed.

A preferred embodiment of this invention is illustrated in the accompanying drawing in which

Fig. 1 is a side elevational view, partly in section, of the apparatus of this invention;

Fig. 2 is a top plan view of the apparatus shown in Fig. 1 with certain parts omitted in the interests of clarity, and

Fig. 3 is a detail view in section, and on an enlarged scale, showing the fluid-operated jet means.

Like reference numerals refer to like parts throughout the several views of the drawing.

Referring now to the drawing for a detailed de-

scription of this invention there is shown a table, indicated generally by reference numeral 11, to which a vertical post 12 is fastened for free rotation. A circular plate 13 is mounted on the post 12 for rotation therewith, and said plate 13 is provided around its periphery with a plurality of pins 14 adapted to support yarn packages 16. During operation, yarn 17 from a package 16 passes upwardly over a circular yarn guide 18 which is fastened to the post 12 for rotation therewith by means of spokes 19.

After passing over the yarn guide 18, the yarn 17 is drawn through a jet means, indicated generally by reference numeral 21, to which air under pressure is supplied through a pipe 22. The jet means 21 is secured by means of a set screw 23 to one end of a curved conduit 24, which conduit is fastened to a supporting framework 26 with straps 27. The other end of the conduit 24 extends through an enlarged neck 28 in cover 29 of a waste can 31. The air entering the jet means 21 carries the yarn 17 upwardly from the package 16, through the conduit 24, and into the waste can 31, the air exhausting to the atmosphere through the neck 28. The supporting framework 26 and straps 27 are omitted from Fig. 2 of the drawing in the interests of clarity.

The jet means 21 comprises a body portion 32 provided with a threaded air inlet 33 to which the pipe 22 is fastened. A bonnet 34 is secured by means of a threaded section 35 to the body 32, and the bonnet 34 is provided with an internally threaded bore 36 through which an externally threaded stem 37 extends. At the free end of the stem 37 there is secured a cap 38 having a curved inlet orifice 39 upon which the yarn rides as it is drawn into a passageway 41 extending through the stem 37. The other end of the stem 37 is provided with a conical plug 42 which fits against a seat 43 on the interior of the body portion 32. A pipe fitting 44, adapted to engage the conduit 24, is threaded into the body portion 32 and is provided with a passageway 46 extending therethrough which forms a continuation of the passageway 41. The passageway 46 tapers outwardly at 47 thereby eliminating any sharp edges which would tend to cut the yarn passing therethrough. By turning the stem 37 counterclockwise the conical plug 42 will be lifted from the seat 43 permitting a flow of air from the body portion 32 through the passageway 46. This will induce a flow of air in the passageway 41, which air will carry any yarn threaded into the orifice 39 through the jet means 21. The conical plug 42 is constructed so that its rear surface 48 will strike inner face 49 of the bonnet 34 to limit the maximum opening between the conical plug 42 and the seat 43 and thereby limit the maximum air flow through the jet means 21. A packing 51 is provided around the stem 37 to prevent any leakage of the air between said stem and the bonnet 34, said package being held in position by a packing gland 52 and a packing nut 53.

During operation, one or more yarn packages 16 are placed on the pins 14 and the yarn from said packages threaded over the yarn guide 18 into the orifice 39. The stream of air from the pipe 22 carries the yarn 17 through the jet means 21 and the conduit 24 into the waste can 31 wherein the yarn accumulates. Thereafter, the plate 13 is rotated to bring additional pins 14 within reach of the operator. Additional yarn packages 16 are then placed on said additional pins 14 and the yarn 17 from said additional packages added to the yarn already passing through the jet means 21. During the rotation of the plate 13, tangling of the yarn 17 is prevented by the simultaneous rotation of the yarn guide 18 which serves to hold each yarn 17 in a vertical alignment with the package 16 from which it is being unwound, the yarn 17 sliding freely on the curved orifice 39 during said rotation. By having the plate 13 rotatable, yarn packages may be placed on all the pins 14 from a single operating position. After the yarn has been unwound from a yarn package the yarn package support is removed from the pin 14 and is ready for re-use.

It is to be understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of my invention.

Having described my invention, what I desire to secure by Letters Patent is:

Apparatus for unwinding yarn from yarn packages, comprising a table, a vertical post mounted on said table for free rotation relative thereto, a plate mounted on said post for rotation therewith, a plurality of pins on said plate for supporting yarn packages thereon, a single fluid operated jet means positioned above said plate, said jet means including a body portion and a yarn inlet passageway having a curved entrance orifice opening into said body portion, a receptacle for receiving the unwound yarn, an arched conduit connected to said jet means and said receptacle, means for introducing fluid into said body portion of said jet means, means in said receptacle for exhausting the fluid, and a single circular yarn guide, having a unitary circular guide surface, fixed to and rotatable with said vertical post, said guide being positioned between yarn packages on said plate and said jet means to maintain each yarn in vertical alignment with the package from which it is being unwound, the construction and arrangement being such that the fluid passing through the body portion of the jet means will simultaneously unwind yarn from the yarn packages and draw the yarn into the jet means over the curved entrance orifice, through the passageway in the body portion of the jet means, through the arched conduit and into the receptacle.

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