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TEXTILE YARN PACKAGE CHANGING ARRANGEMENTS

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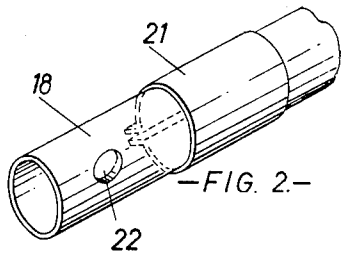
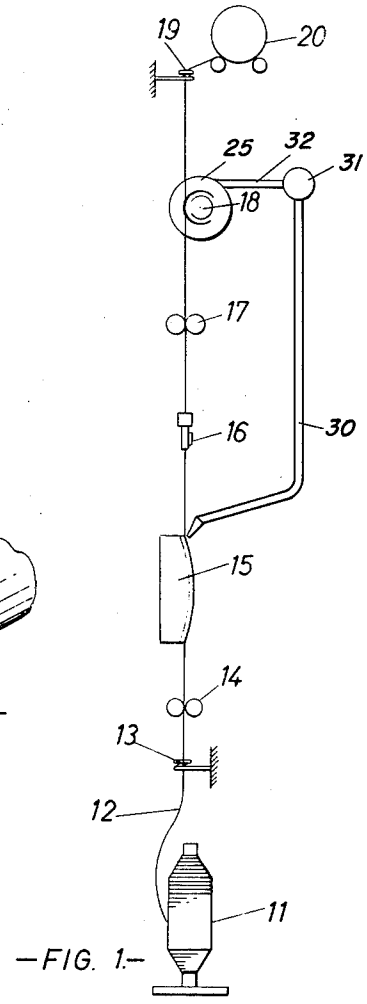
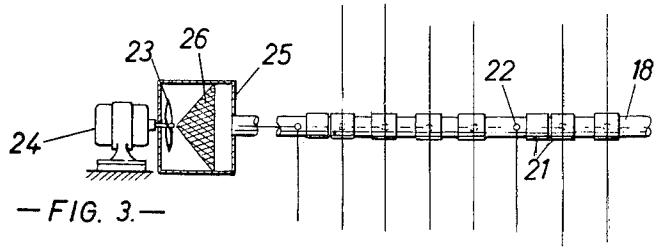


—FIG. 2.—



—FIG. 1.—



—FIG. 3.—

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The present invention concerns machines acting on continuously running textile yarns, and has for its object the provision of a facility for enabling full bobbins in such machines to be exchanged for empty ones without arresting the motion of the machine.

The invention is more particularly concerned, though not essentially so, with a machine which acts on a continuously running yarn composed of thermoplastic continuous filaments. Such a machine may, for example, extend the yarn, or allow it to contract whilst heated; alternatively the machine may apply a false twist crimp to the yarn whilst it is passing through a heated chamber.

In such machines, the tendency is to treat yarns moving at higher speeds than heretofore. Thus in one example, where false twist is applied to a yarn at the rate of say 50,000 r.p.m., this twist being set in a heating zone, the forwardly speed of the yarn through the machine has been 50 or 60 feet per minute. This is to enable an adequate degree of twist to be applied to the yarn during crimping, the rate of application of the twist being limited by the rate at which the false twist device could be operated. Since, however, it has recently become possible to apply false twist to a running yarn at speeds greatly in excess of 50,000 r.p.m., correspondingly high rates of yarn throughput become possible. These rates, more particularly if applied to yarns of fairly heavy denier, mean that a continuous throughput of yarn in the heating zone is essential, since, if the yarn for any reason ceases to traverse the heating zone, the temperature of the latter tends to rise to such a degree that, when the yarn is reintroduced, the yarn either burns or for an appreciable period is treated at a temperature which is too high. It, therefore, follows that in changing from a full take-up package to an empty one, yarn throughput must not be interrupted. This condition imposes a duty on the machine operator which previously was easy enough to perform, but now, when throughput speeds in the order of several hundreds of feet per minute become possible, the transfer of yarn from a full package to an empty support becomes increasingly difficult to perform manually without stopping the machine. This is because the operator, in removing the full package, must break or cut the yarn, replace the full package with an empty support and then start the yarn on the latter.

Unless this is done at a very high speed, a length of treated yarn accumulates, which is not taken up on the receiving support, and this length of yarn may drop into the machine, wind itself round any moving part and thence produce a lap which is difficult to clear, or burn in the heating zone.

The invention, therefore, provides means for continuously removing the yarn being fed to a full take-up package whilst the latter is being changed.

According to the invention, in a machine handling continuously running textile yards, a suction device is disposed in the vicinity of the path of one or more yarns in its movement towards a take-up package, such suction device having an inlet hole adjacent the path of each yarn and leading to a receiving device for yarn drawn into the hole by the suction device, whereby, if a yarn is severed at or beyond the suction device the free end of the yarn being fed is removed through the hole and the yarn is continuously drawn into the receiving device as it is fed.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a schematic layout of the various machine parts acting on a single yarn;

FIG. 2 is a perspective view of an end part of the suction tube used for removing the yarn; and

FIG. 3 is an elevational view of the suction device of the machine showing part of the length of the tube extending across a plurality of yarns being treated by the machine.

Whilst FIG. 1 shows the parts acting on a single yarn, it is to be understood that the full machine comprises a large number of sets of such parts arranged side by side across the width of the machine. Each set of parts is suitably mounted on the frame of the machine and comprises a supply package **11** from which a yarn **12** is drawn through a pigtail guide **13** by feed rollers **14** and extends through a heating device **15**, a false twist device **16**, further rollers **17**, and passes over a suction tube **18** and through a further pigtail guide **19** to a take-up package **20**. All of these parts except the tube **18** are of conventional form and will not be described in detail either as to construction or operation.

The tube **18**, as will be seen from FIGS. 2 and 3, has holes **22** at intervals corresponding to the spacing of the individual yarn paths across the machine and carries an equal number of sleeves **21** which are slidable to cover and uncover the holes **22**. The tube **18** is attached at one end to an air-exhausting device comprising a container **25** housing a suction fan comprising a motor **24** and blades **23**. Between the fan and the tube **18** is disposed a filter **26** which serves to prevent yarn drawn into the tube **18** from entering the part of the container housing the fan motor and blades.

When the machine is in use and it is required to change a full take-up package for an empty one, the operator opens the hole in the tube at a position corresponding to the yarn to be acted upon. The operator then cuts the yarn below the take-up package and quickly inserts the yarn end in the opened hole. The reduced pressure in the tube causes a rapid influx of air through the hole sufficient to pull the yarn along the tube and against the filter where it is stopped and accumulates. Thereafter the operator removes the full package, replaces it with an empty support, causes the empty support to rotate and then with a rapid movement cuts the yarn entering the hole in the tube and applies the cut end to the rotating surface of the support. Finally, the operator closes the hole in the tube.

By the means outlined it is possible to change packages on a yarn treating machine in which the rate of treatment is much greater than that of machines hitherto produced. This is advantageous, not only in that the machine need not be stopped either as a whole or in part, but also that as stated above, the temperature of a heat treating zone for the yarn if used is not appreciably changed.

It has been found that the provision of an air extraction plant enables a secondary advantage to be realised in connection with yarn treating machines in which heat is applied to the yarn at one stage of the treatment. Under such conditions it is common to employ as a heating device a tube or curved channeled surface, which may be heated electrically, the yarn running through the tube or over the surface. As such yarns are often subject to the application of a very small quantity of lubricating oil at some process during manufacture, there is a tendency for burn or vapourised oil, with possibly the addition of a monomer breakdown product, to accumulate

at the top of the heated zone as a black adhesive layer. Unless prevented or removed, this layer may in time interfere with the passage of yarn through the heated zone and/or produce discoloured patches on the yarn. It has been found that the formation of this black layer can be obviated or reduced by the provision at the top of the heated zone of a suction tube **30** connected to the fan container **25**, this tube being employed to remove fumes continuously from the upper end of the heater. In order to accommodate the several units which are located beside each other, the several tubes **30** lead to a common header **31** which is connected by way of the tube **32** to the fan container **25**. The total quantity of air employed for this purpose need be relatively small, but the advantage of the removal of the fumes is appreciable.

Whilst the machine described in the foregoing description to illustrate the embodiment of the invention and its manner of performance functions to impart a false twist to the yarn, it will be appreciated that the invention is equally applicable to any yarn handling machine in which a continuously running yarn is fed to a take-up package.

I claim:

1. In a machine for handling continuously running textile yarn and feeding such yarn to a take-up package, suction means disposed in the vicinity of the path of a yarn in its movement through the machine towards the take-up package, such suction means comprising a suction tube having an inlet hole therein adjacent the path of said yarn, a yarn receiving container connected to the suction end of said tube and a suction source connected to exhaust said container whereby, if the yarn is severed beyond a point corresponding to said hole toward the take-up package, the free end of the yarn being fed is drawn into the hole and the yarn is continuously drawn into said container as it is fed, and means cooperating with said suction tube for optionally closing said inlet hole thereof.

2. In a machine for handling continuously running textile yarns and feeding such yarns to individual take-up packages, suction means disposed in the vicinity of the paths of said yarns in their movement towards the take-up packages, such suction means comprising a suction tube extending transversely of said paths and having a plurality of inlet holes therein spaced along its length at intervals corresponding to the spacing between adjacent yarn paths and a yarn receiving container connected to the suction end of said tube and a suction source connected to exhaust said container, whereby if any one of said yarns is serevered at a point beyond the hole in said tube corresponding to such yarn, the free end of the yarn being fed is drawn into the hole and the yarn is continuously drawn into said container as it is fed, and means cooperating with said inlet holes of said suction tube for optionally closing said inlet holes.

3. A machine as set forth in claim 2, wherein said tube has a plurality of sleeves slidably arranged thereon, one such sleeve for each hole in the tube, each said sleeve being displaceable to cover and uncover its corresponding hole.

4. In a machine for handling continuously running textile yarns and feeding such yarns to individual take-up packages, suction means disposed in the vicinity of said take-up packages and comprising a suction tube extending transversely of the paths of the yarns in their movement towards said take-up packages, said tube having inlet holes spaced at intervals along its length corresponding to the spacing between the paths of adjacent yarns so that each yarn path lies over a hole in said tube, a yarn receiving container connected to the suction end of said tube, a suction fan mounted in said container, and filter means disposed between said fan and said tube, whereby if any one of said yarns is severed at a point beyond the hole in said tube corresponding to such yarn the free end of the yarn being fed is drawn into the hole and the yarn is continuously drawn into said container as it is fed, and means cooperating with said inlet holes of said suction tube for optionally closing said inlet holes.

5. A machine as set forth in claim 4, wherein said means cooperating with said inlet holes includes a plurality of sleeves slidably arranged on said tube, one such sleeve for each hole in the tube, each said sleeve being displaceable to cover and uncover its corresponding hole.

6. In a machine for heat treating continuously running textile yarns and feeding the treated yarns to individual take-up packages, heat treating means for each yarn, suction means disposed between said heat treating means and said take-up packages and comprising a first suction tube extending transversely of the paths of the yarns in their movement towards said take-up packages, said tube having inlet holes spaced at intervals along its length corresponding to the spacing between the paths of adjacent yarns so that each yarn path lies over a hole in said hube, a yarn receiving container connected to the suction end of said tube, a suction fan mounted in said container and filter means disposed between said fan and said tube, whereby if any one of said yarns is severed at a point beyond the hole in said tube corresponding to such yarn the free end of the yarn being fed is drawn into the hole and the yarn is continuously drawn into said container as it is fed and a second suction tube connected at one end to said heat treating means and at the other end to said container and serving to exhaust fumes from said heat treating means.

7. A machine as set forth in claim 6, wherein said first tube has a plurality of sleeves slidably arranged thereon, one such sleeve for each hole in the tube, each said sleeve being displaceable to cover and uncover its corresponding hole.

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