

April 20, 1954

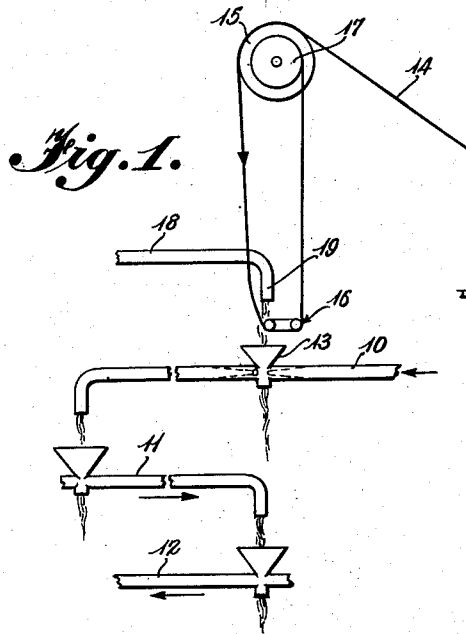
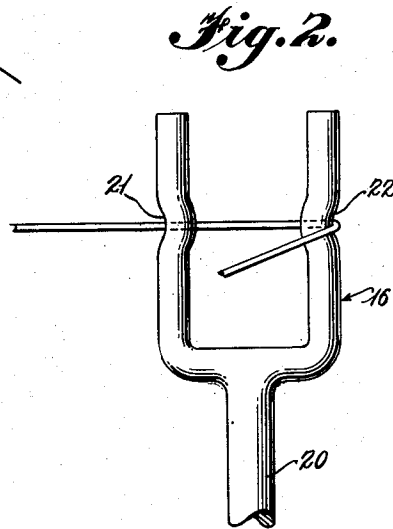
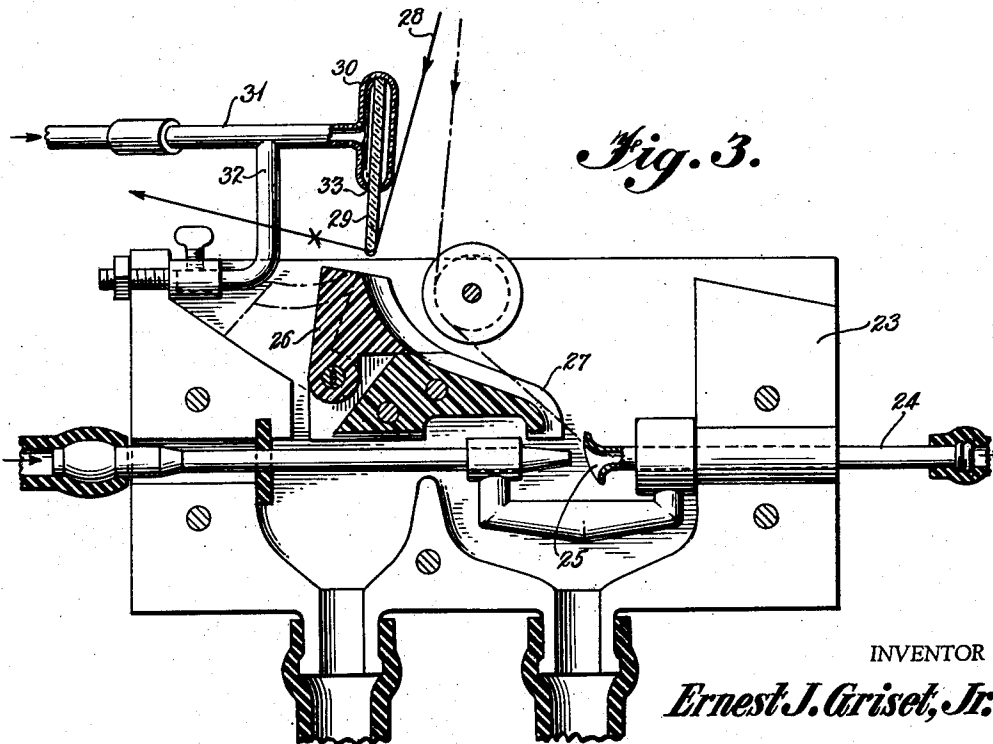
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2,675,908

PROCESS AND APPARATUS FOR INTRODUCING RUNNING THREADS

Filed Aug. 29, 1951

2 Sheets-Sheet 1



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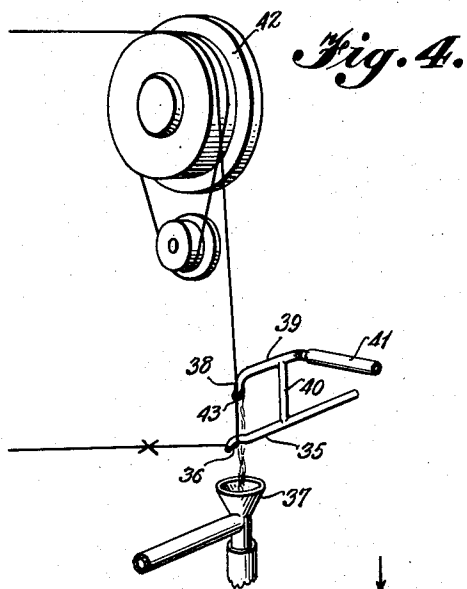
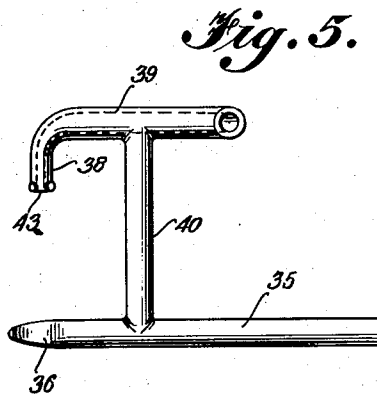
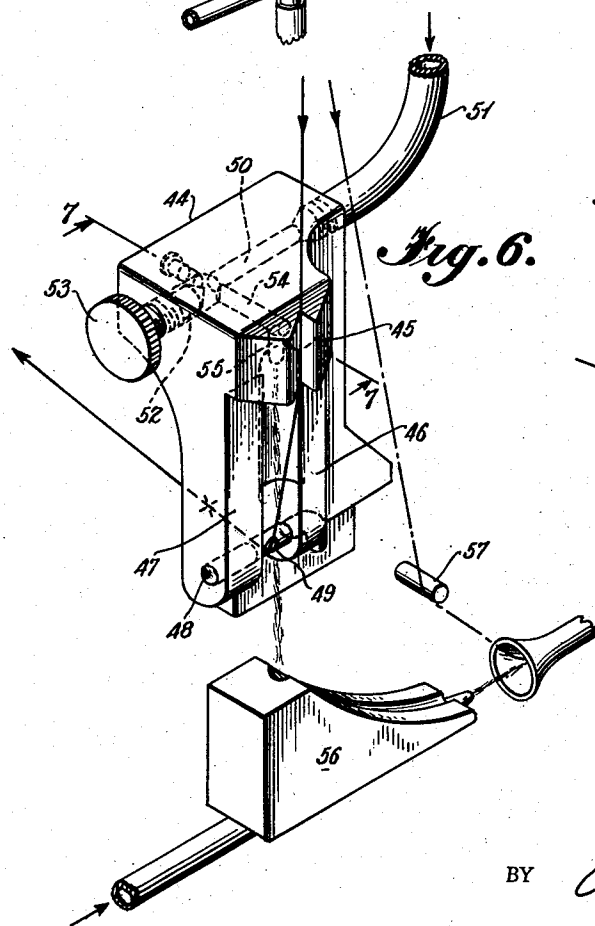
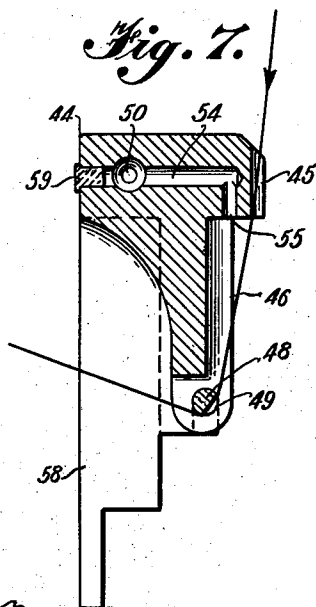
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PROCESS AND APPARATUS FOR INTRODUCING RUNNING THREADS

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2,675,908

PROCESS AND APPARATUS FOR INTRODUCING RUNNING THREADS

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Application August 29, 1951, Serial No. 244,115

8 Claims. (Cl. 203—65)

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This application is a continuation-in-part of my copending application Serial Number 122,560, filed October 20, 1949, which is a continuation-in-part of my application Serial Number 91,253, filed May 4, 1949 and now abandoned.

The above-identified applications relate to methods and apparatus for the liquid treatment of threads running in a system of tubes, the treating liquid in each tube acting also as the propelling agent for the thread. In this type of system the problem exists of introducing the yarn or thread to be treated to the first tube of the system. Since the tube is small and the fluid flowing therein is moving at high velocity, the matter of getting the thread to intersect the fluid for entrainment thereby presents considerable difficulty and, when it is borne in mind that the tube is usually threaded with an end running at a speed of from 60 to 150 meters per minute, the magnitude of the problem can be fully appreciated.

When the problem described above was finally solved, it was by guiding the running thread to temporary storage through a path having a point lying adjacent the ingress of the first tube of the system, cutting the thread at said point and propelling the running end into the tube. Further experimentation has but confirmed the soundness of this principle of operation although considerable progress has been made by way of consolidating the structure which defines the point adjacent the ingress of the tube with the wash water supply and in improving the physical ruggedness and cost characteristics of the structure in order to adapt it to use on a commercial basis.

This invention, therefore, relates to methods and apparatus for introducing a running thread into a high velocity liquid stream and has for its objects reliability, low initial and maintenance cost, and ease of operation.

Other objects and advantages of this invention will be apparent upon consideration of the following detailed description of several embodiments thereof in conjunction with the annexed drawings wherein:

Figure 1 is a schematic view of a portion of a tube spinning machine showing a spigot, bifurcated guide and temporary collecting device, all constructed and arranged according to the present invention;

Figure 2 is a view in elevation to an enlarged scale of the bifurcated guide of Figure 1;

Figure 3 is a view partially in section and partially in elevation of a combined thread guide and

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spigot shown adjacent the ingress of a tube spinning machine;

Figure 4 is a schematic perspective view of a modified combined guide and spigot shown in operative relation to the mouth of the first tube of a tube spinning system;

Figure 5 is a view in elevation to an enlarged scale of the guide and spigot of Figure 4;

Figure 6 is a perspective view of still another type of combined guide and spigot shown in operative relation to a tube of a tube spinning system; and,

Figure 7 is a view in section taken on the line 7—7 of Figure 6.

Referring now in greater detail to Figures 1 and 2 of the drawings, three tubes, 10, 11 and 12 of a tube liquid treating system are shown in their thread introducing positions. In these positions water is passed from right to left through the tube 10, from left to right through tube 11 and from right to left through tube 12. Each tube is provided with an entry or ingress funnel such as the funnel 13 associated with the tube 10 and just under the funnel there is a Venturi in the tube whereby a thread entering the funnel is entrained by the liquid in the tube. After the thread is fed through the tubes, the funnels are shifted relative to the exit ends of the tubes and water is replaced by an appropriate treating liquid in each tube, all as described in my prior application Serial Number 91,253, filed May 14, 1949.

This invention is concerned with the delivery of a freshly spun thread 14 issuing from a spinning bath, not shown, and sought to be introduced into the funnel 13 of the first tube 10 of the tube liquid treating system.

The yarn or thread led from a source, not shown, is passed over a godet 15, see Figure 1, and is then led downwardly across the tines of a guide fork 16 and upwardly to a waste-collecting roller 17 mounted on the same shaft as the godet 15. Water is supplied through a conduit 18 having a spout or spigot 19 lying vertically in registry above the Venturi in the tube 10. Assuming the liquid to be running in the tubes 10, 11, 12, etc. in the normal fashion, it is only necessary for the operator to cut the yarn running between the tines of the fork 16 to initiate the introduction of the thread into the tubes. As soon as the yarn is cut, the descending free end issuing from the godet is washed by the liquid issuing from the spout 19 into the top of the funnel 13. The cut length of yarn is immediately wound onto the waste collector 17.

The structural design of the two-pronged thread guide 16 can be better understood by reference to Figure 2 in which it is illustrated in plan and to an enlarged scale. The guide 16 is made of glass and includes a supporting stem 20, which fits into a conventional thread guide holder for positioning relative to the remainder of the apparatus as indicated in Figure 1. The tines or prongs of the guide 16 are provided with indentations at 21 and 22 and these indentations serve to position the thread over the funnel 13 and with the descending run of yarn in position to be engaged by the water issuing from the outlet spigot 19 on the pipe 18 to be washed into the funnel 13 as soon as the thread running between the tines of the guide is cut.

Before proceeding with the description of the thread-introducing device of Figure 3, it is necessary to call attention to the fact that in Figure 3 the tube spinning system is somewhat different from that shown in Figure 1. It involves basically a housing 23 containing an interrupted tube 24 having a funnel mouth Venturi at 25. During the initial period thread-introducing liquid is washed over movable trough 26 and fixed trough 27, the latter discharging into the Venturi. After the thread has been introduced into the tubes, the movable trough 26 is moved to the broken line position of Figure 3, whereby any liquid from above bypasses the Venturi, all in the manner described in my copending application Serial Number 122,560, filed October 20, 1949.

When the operation is to be initiated, the tube 24 and the other tubes of the system which are not shown, are supplied with water or treating liquid. Thread 28 from a suitable source, not shown, is led downwardly over a vitreous guide 29 having a thread-guiding notch in its bottom edge to a temporary collecting device similar to the godet 17 of Figure 1, not shown. The upper portion of the vitreous guide 29 is encased in and supported by a capsule-like body 30. The capsule 30 is connected to and supported by pipe 31 which in turn is supported from a bracket 32 connected to the housing 23. Water is led to the interior of the capsule-like member 30 and this water is supplied to the lower end of the guide 29 through the capsule mouth 33. When the thread is being taken up on the temporary collecting device and is running in the full line position of Figure 3, the deflector 26, being also in the full line position of that figure, the thread is cut at point x. The effect of the water issuing from the capsule 30 is to wash the thread over movable trough 26 and coaxing stationary trough 27 into the flared mouth of the tube 24. Thereafter, propulsion of the thread is taken care of by the water jet in the tube system. Once the operation is complete, movable deflector 26 is shifted to the chain line position of Figure 3 and the water supply leading to the capsule 30 is cut off by suitable valve arrangement, not shown.

It will be observed that the form of the invention shown in Figures 1 and 2 involves a thread guide which is physically separate and distinct from the water supply to wash the thread into the funnel after it is cut. In view of the fact that the position of the spigot relative to the guide is rather critical, it is apparent that the device of Figures 1 and 2 is open to the objection that fairly critical adjustment and maintenance thereof is necessary to satisfactory operation. In Figure 3, on the other hand, it will be observed that the water supply conduit 31

constitutes the support for the thread guide 29 so that in installation, the device is self-adjusting.

Another form of the invention also characterized by the mutual support of the spigot or spout and the guide, so that the two are always in a predetermined relative position, is shown in Figures 4 and 5. In this form of the invention, a vitreous guide 35 is provided having at one end thereof a notch 36 which is positioned above and in alignment with the receiving funnel 37 of the first tube of the system which is illustrated to be of the type shown more fully in Figure 1. Vertically above the notch 36 there is located a spout 38 of a water supply spigot 39. The spigot 39 and the guide 35 are connected by a glass rod 40 in such a way that the spout discharges its stream vertically through the notch 36 in the guide 35 and into the funnel 37. Water is supplied as required through a conduit 41 connected to the spigot 39 and provided with a suitable valve, not shown.

In use, thread led from a source, not shown, is passed over a godet 42 and then led downwardly to a point of temporary collection, not shown, which, however, is above the funnel 37. Then a loop is drawn between the godet 42 and the point of temporary collection and the loop is passed around the guide 35 and allowed to fall into notch 36 of that guide. A notch 43 in the front edge of the spout 38 serves to maintain the thread in a straight path from the spout 38 to the guide 35, the notches 43 and 36 being accurately vertically aligned. When thread is introduced into the funnel 37 it is cut at x, see Figure 4, and a stream of water from the spout 38 washes the running end into the funnel. Thereafter the action of the liquids in the system is as previously described.

While the forms of the invention shown in Figures 1 to 5, inclusive, have been found to be successful in operation, the construction of glass or other vitreous material renders the same rather fragile for plant installation purposes and in Figures 6 and 7 there is shown a construction which is basically quite similar to the constructions of Figures 3, 4 and 5, but which is characterized by ease of assembly, low cost of production and rugged construction, rendering the same highly suitable for commercial operation.

In this case a block 44 of any suitable metal resistant to the liquids which the thread may entrain is cast to provide on its forward edge a thread guiding notch 45 and, below that notch, bifurcated supports 46 and 47. Holes are drilled near the lower ends of the supports 46 and 47 and a removable vitreous rod 48 is inserted through those holes, the rod having therein a guiding notch 49 corresponding in structure and in function to the notch 36 in the guide 35 of Figure 5. The guide is, however, readily removable in the event of breakage.

Intersecting holes are drilled in the top of the casting 44 to provide a water access passage-way 50 to which a water supply conduit 51 is connected. Opposite the water supply conduit there is drilled an aperture which receives a valve 52 provided with an operating handle 53, the valve seating in the mouth of the conduit 50. A conduit 54 leads at right angles from the conduit 50 to a point vertically above the notch 49 where it connects to a vertical conduit 55 discharging downwardly in vertical registry with the notch 49 so as to wash thread passing through

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the notch 49 into the trough system 56 of a tube spinning system of the type shown in Figure 3.

In operation the form of the invention shown in Figures 6 and 7 is similar to that shown in Figures 4 and 5. The thread is led from a source not shown, the point of temporary collection lying not shown to a point of temporary collection also not shown, the point of temporary collection lying to the rear of the housing 44. The operator pulls a loop between the source and the point of temporary collection and drops the thread in the guide 45 and in the notch 49 so that it runs in the full line position of Figure 6. Thereafter the valve 52 is opened so that water is washed out of the conduit 55 toward the trough 56 as shown in Figure 6 and while the water is so running and liquid is running in the spinning system, the thread is cut at the point x. Once it enters the tube system, it is somewhat displaced to the chain line position of Figure 6 where it passes around a stationary guide 57 before entrance into the Venturi. It will be observed that an integral bracket 58 constitutes the supporting element for the housing 44. This bracket is located to one side of the housing so as to permit a loop to be pulled between the thread supply and point of temporary collection and so that that loop may be released into the notches 45 and 49. The block which is shown at 59 in Figure 7 is to close the passage 54 and to afford access for cleaning the valve seat in the mouth of conduit 50, should that be necessary.

While the form of the invention shown in Figures 2, 4, and 5 is illustrated in association with a tube system of the type in which a funnel leads to the Venturi rather than a deflector, it is to be understood that all of the forms of thread guides for use in introducing the thread into the tube systems which are shown in this application are susceptible of use with either the funnel-mouth type of tube illustrated in Figures 1 and 4 or the deflector type illustrated in Figures 3 and 6.

While the temporary collecting device has not been shown in the figures of drawing except Figure 1, it is to be understood that such device is located in all instances on the side of the guide opposite to which the thread runs to the guide and in a position at least above the ingress to the first tube of the system and preferably above the guide itself.

What is claimed is:

1. Apparatus for introducing a thread into a liquid stream projected into the flared mouth of a tube that comprises thread delivery means disposed above the tube, a waste collecting device disposed above the tube, a notched guide disposed above the mouth of the tube but below the thread delivery means and the waste collecting device and in the thread path therebetween, and means for flowing a liquid over the surface of said guide so that when the thread is cut between the guide and the collecting device it is washed into the mouth of the tube.

2. In apparatus as claimed in claim 1, means defining a channel leading from a point adjacent the lower end of said guide to a point adjacent the mouth of said tube to assist in guiding the thread into the mouth of the tube after cutting.

3. Apparatus for introducing a running thread into a liquid stream projected into the mouth of a tube that comprises thread delivery means and a waste collecting device, both disposed above the tube, a notched guide disposed above the mouth of the tube but below the thread delivery

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means to define a point in the thread path between said delivery means and said waste collecting device, a spout above said guide for flowing liquid thereover so that when the thread is cut between the guide and the collecting device it is washed into the mouth of the tube, and means rigidly interconnecting said spout and said guide to maintain them in a predetermined relative position.

4. Apparatus for introducing a running thread into a liquid stream projected into the mouth of a tube that comprises thread delivery means and a waste collecting device, both disposed above the tube, a notched guide disposed above the mouth of the tube but below the thread delivery means to define a point in the thread path between said delivery means and said waste collecting device, a spout above said guide for flowing liquid thereover so that when the thread is cut between the guide and the collecting device it is washed into the mouth of the tube, means rigidly interconnecting said spout and said guide with the spout discharging vertically in alignment with the notch in the guide, said interconnecting means including a valve housing and a valve in said housing for controlling flow to said spout.

5. Apparatus for introducing a running thread into a liquid stream projected into the mouth of a tube that comprises thread delivery means and a waste collecting device, both disposed above the tube, a notched guide disposed above the mouth of the tube but below the thread delivery means to define a point in the thread path between said delivery means and said waste collecting device, a spout above said guide for flowing liquid thereover so that when the thread is cut between the guide and the collecting device it is washed into the mouth of the tube, a guide on said spout parallel to its axis of discharge, and means rigidly interconnecting said spout and said guide to maintain them in a predetermined relative position.

6. Apparatus for introducing a thread into a liquid stream flowing in a tube that comprises a funnel leading to the interior of the tube, thread delivery means disposed above the funnel, a waste collecting device also disposed above the funnel, a forked guide disposed above the funnel with one of its prongs directly above the funnel mouth but below the thread delivery means and the waste collecting device and in the thread path therebetween, and a spigot for projecting a liquid into the thread path between the delivery device and that prong of the fork directly above the funnel mouth whereby when thread is running between the delivery device and the waste collecting device across said guide and liquid is issuing from said spigot the threading operation can be accomplished by clipping the thread running between the prongs of said guide.

7. The method of introducing a thread into a tube system that comprises establishing a running thread to a point of delivery above the entrance to a tube spinning system, temporarily collecting the running thread, drawing a loop between the delivery and temporary collection points and establishing a thread path between said points that changes direction above the entrance to the tube spinning system, establishing a liquid stream past said point of change of direction toward the entrance to the tube spinning system and cutting the thread between said point of change of direction and said point of temporary collection.

8. A method of introducing a thread fed from a continuous source into a tube system which comprises establishing a thread suction zone in the path of a thread treating zone, initially passing the thread around a thread guide and directing the thread to a temporary point of collection, guiding a jet of liquid into contact with the thread upstream of the guide and in substantially parallel and concurrent relationship with the thread and severing the thread between the thread guide and point of collection where- by the thread is carried by the liquid into the

thread suction zone and thereby drawn into the liquid treating zone.

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