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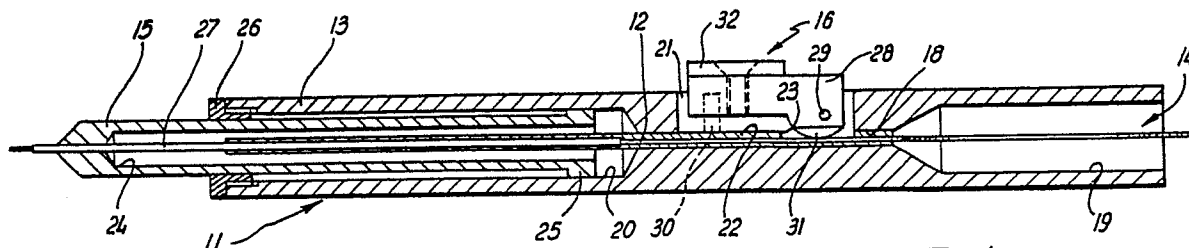
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54 Threading of wires.

57 An insertion tool for facilitating the introduction of an elongate member, say the lead-in of a pintle wire, into interdigitated loops at the opposed ends of a papermakers fabric to make the same endless is proposed, the tool comprising two telescopically engaged members (13, 15) a first one of which (15) is intended to be located adjacent the end of the tunnel formed by the loops and the second one of which (13) is reciprocated relative thereto, there being manually actuatable cam means (16) on the second member (13) adapted to lock such member (13) to a lead-in wire (12) extending axially of the tool and to advance said wire (12) through the first member (15) on reciprocation in an appropriate sense.



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## THREADING OF WIRES

The invention concerns the threading of wires, and has particular, though not exclusive, reference to the introduction of a lead-in wire into the interdigitated loops of the respective opposed ends of a flat-woven papermakers' fabric.

In joining together the opposed ends of a papermakers' fabric, it is usual to interdigitate the loops provided at the respective fabric ends, to thread a lead-in wire through the tunnel formed by the interdigitated loops, and to utilise such lead-in wire to draw a seam wire into position within the tunnel, the lead-in wire then being separated for re-use or discarded.

Conventionally the lead-in wire is introduced by pushing such wire into the tunnel by hand. Difficulty is experienced in introducing the wire through the full fabric width, which width may amount to, say, ten metres, since frictional resistance to movement increases with progressive penetration and such resistance may give rise to permanent kinking of the wire which itself will make more difficult or will prevent further introduction of the wire.

The object of the present invention is to provide a means for use in introducing a lead-in wire which will allow of a more effective threading of the wire into the interdigitated loops than has been possible heretofore.

According to the invention there is proposed an insertion tool for movement of an elongate element in a tunnel formed by interdigitated loops comprising telescopically engaged first and second tubular members, support means coaxially arranged therein and adapted to receive and support the said element, and selectively operable means on one said member adapted, upon actuation, to lock said member relative to the elongate element for movement thereof.

Preferably, the first and second tubular members include respective telescopically engaged tubes, the elongate element being a free but close fit within the innermost of said tubes.

According to a further preferred feature, the selectively operable means include a manually actuable cam profile engageable with an elongate element positioned within the outermost of said tubes.

The invention will now be described further, by way of example only, with reference to the accompanying drawings illustrating one embodiment thereof and in which:

Fig. 1 is a longitudinal section through the insertion tool of the invention; and

Fig. 2 is a diagrammatic side elevation showing the insertion tool in position at a fabric edge.

Referring now to the drawings, and particularly to Fig. 1 thereof, an insertion tool 11 for introducing a lead-in wire 12 into the tunnel formed by the interdigitated loops of two opposed fabric ends comprises a cylindrical body part 13 having a through bore 14 thereto, a sleeve member 15 in sliding telescopic engagement with the body part 13 at one end thereof, and an actuator means 16 supported in the body part and engageable with a wire extending through the tool.

Body part 13 is approximately 2 cm in diameter and 20 cm in length, the bore 14 thereto being stepped to provide a central region 18 of small diameter between larger diameter inlet and outlet regions 19, 20, respectively.

The bore 14 is approximately 1.4 cm in diameter in inlet and outlet regions 19, 20, whilst such regions are respectively 5.7 and 8.5 cms in axial extent. A slot 21 is provided in the wall of the body part, in register with the central region 18, to receive the actuator means 16, as will hereafter be described in greater detail.

A small diameter tube 22 having an inside diameter of approximately 0.175 cm is arranged coaxially with the body part, tube 22 being approximately 14 cm long and being of such outside diameter as to be a press or interference fit in the central region 18 of bore 14. Tube 22 extends throughout the full axial extent of the central and outlet regions 18, 20 of bore 14 and the wall of said tube 22 is slotted, as at 23, in register with slot 21 to provide access for actuator means 16.

Sleeve member 15 is approximately 11 cm long and 1.1 cm outside diameter, the bore 24 to such member being stepped and there being a radially outwardly directed flange 25 at the inner end thereof which is clearance in the outlet region 20 of bore 14 and is freely slidable therein. The bore 24 is of materially reduced diameter at the outer end of the member, as will hereafter be made apparent.

Sleeve member 15 is held captive in body part 13 by a bush 26 in screw-threaded engagement with the outer end of said body part, the bush 26 co-operating with flange 25 in limiting outward movement of member 15 relative to the body part.

A small diameter tube 27 is provided longitudinally of the sleeve member, tube 27 extending outwardly from such member at each end thereof by approximately 0.5 cm and being an interference fit with the reduced diameter part of bore 24 in

sleeve member 15. Tube 27 is clearance in tube 22, and has a bore such that the wire to be introduced is a close but free fit therein.

Actuator means 16 comprises a lever arm 28 mounted on a pin 29 extending transversely of the body part, lever arm 28 being located within slot 21 and being spring-loaded outwardly thereof about the pivot axis defined by pin 29 by a coil spring 30 located between tube 22 and the underside of the lever arm. Lever arm 28 includes a cam profile 31 centred on pin 29, the cam profile being such that on pivotal movement of the lever arm 28 against the restraint of spring 30 said profile moves into the bore of tube 22 through slot 23 thus to reduce the transverse cross-section thereof. An actuator button 32 is provided on lever arm 28.

In the assembled condition of the insertion tool, sleeve member 15 is arranged coaxially with the bore 20 at the outlet end of the body part 13 with tube 27 carried by sleeve member 15 freely slidable within tube 22.

In use, and with a lead-in wire 12 threaded through the tool, sleeve member 15 is held in position at the fabric edge in alignment with the interdigitated loops, and the body part 13 is withdrawn relative to the sleeve member. The wire 12 is locked to body part 13 by pivoting the lever arm 28 to bring cam profile 31 into contact with the wire through slot 23, and the body part 13 is then advanced relative to sleeve member 15, the wire thus being fed through tube 27 and into the tunnel formed by the interdigitated loops. On release of the actuator means 16, the body part is again withdrawn, tube 22 moving freely over tube 27 and over wire 12, further wire feed following from depression of the lever arm and advance of the body part.

As will be appreciated, the wire is closely supported in its movement towards and into the seam, and thus the possibility of kinking is eliminated. Furthermore, the pumping action by which the wire is progressively introduced into the seam offers a more uniform, reproducible and effective threading operation than has hitherto been possible.

It has been found that the threading operation is further facilitated by utilising a mounting block 34 secured to the fabric edges 35 by clips 36 and adapted to receive the outer end of the tool 11, the arrangement being shown diagrammatically in Fig. 2 of the drawings.

The invention is not restricted to the exact features of the embodiment hereindescribed and illustrated, and alternatives will readily present themselves to one skilled in the art. Thus, whilst it is preferred that telescoping tubes 22, 27 be provided whereby the lead-in wire is fully supported during progressive insertion into the seam, it may be found sufficient in some circumstances to pro-

vide a lesser degree of control and thus provide a bore to the sleeve member which is merely clearance on tube 22, tube 22 being dimensioned as to its cross section as to receive the wire as a free but close fit therein. In the event that the pintle wire is to be drawn into position through the tool, as distinct from the tool being removed and the pintle wire then being connected to the lead-in wire, the through bore to the tool will be of such dimension as to allow free passage therethrough of the connecting sleeve.

Whilst the insertion tool of the invention is intended for use in the context of seaming paper-machine clothing, and particularly dryer fabrics, it is thought to be of application in any context where support of the wire is of importance.

## Claims

1. An insertion tool for movement of an elongate element in a tunnel formed by interdigitated loops comprising telescopingly engaged first and second tubular members, support means coaxially arranged therein and adapted to receive and support the said element, and selectively operable means on one said member adapted, upon actuation, to lock said member relative to the elongate element for movement thereof.

2. An insertion tool as claimed in claim 1, wherein the said first tubular member is of stepped bore configuration and said second tubular member is captively engaged with said first member to extend from one end thereof.

3. An insertion tool as claimed in claim 1 or 2, wherein the said selectively operable means extends through the wall of the said first tubular member.

4. An insertion tool as claimed in claim 3, wherein the bore to the said first tubular member is of reduced transverse dimension at a position remote from said one end, and the said selectively operable means is provided in radial register with said reduced dimension.

5. An insertion tool as claimed in claim 3 or 4, wherein the selectively operable means includes a manually actuable cam profile engageable with an elongate element extending axially of the tool.

6. An insertion tool as claimed in any one of the preceding claims, wherein the first and second tubular members include respective telescopingly engaged tubes, the elongate element being a free but close fit within the innermost of said tubes.

7. An insertion tool as claimed in claim 6, wherein the telescopingly engaged tubes are dimensioned for free sliding movement therebetween.

8. An insertion tool as claimed in claim 6 or 7, wherein the wall of the outermost of the said telescopingly engaged tubes is apertured to provide access to the interior thereof for the said selectively operable means.

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9. An insertion tool as claimed in claim 1, wherein the said first and second tubular members include respectively telescopingly engaged tubes arranged in mutual sliding relationship, the said tubes extending to the adjacent ends of the respective tubular members.

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10. An insertion tool as claimed in any one of the preceding claims, in combination with a clip releasably engageable with a fabric edge, the clip being adapted to receive the tool into secure operative engagement therewith.

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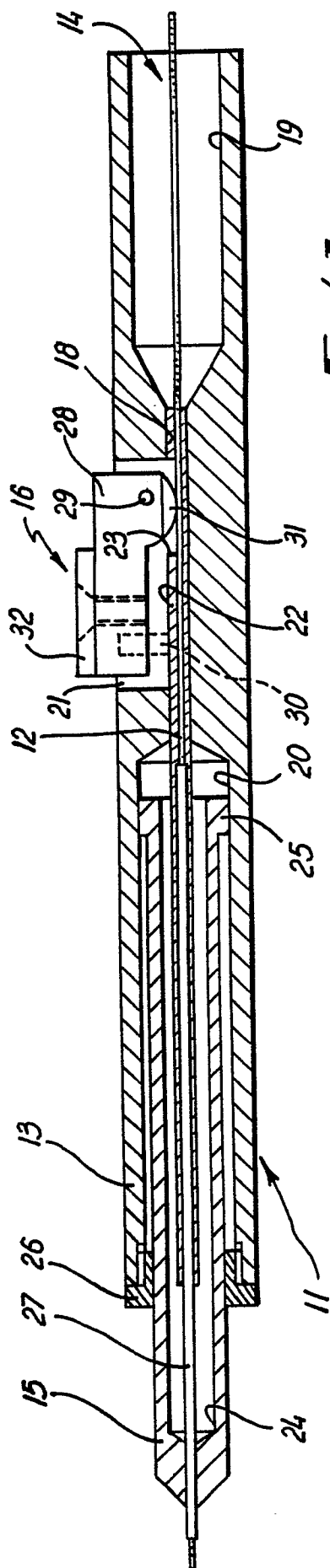
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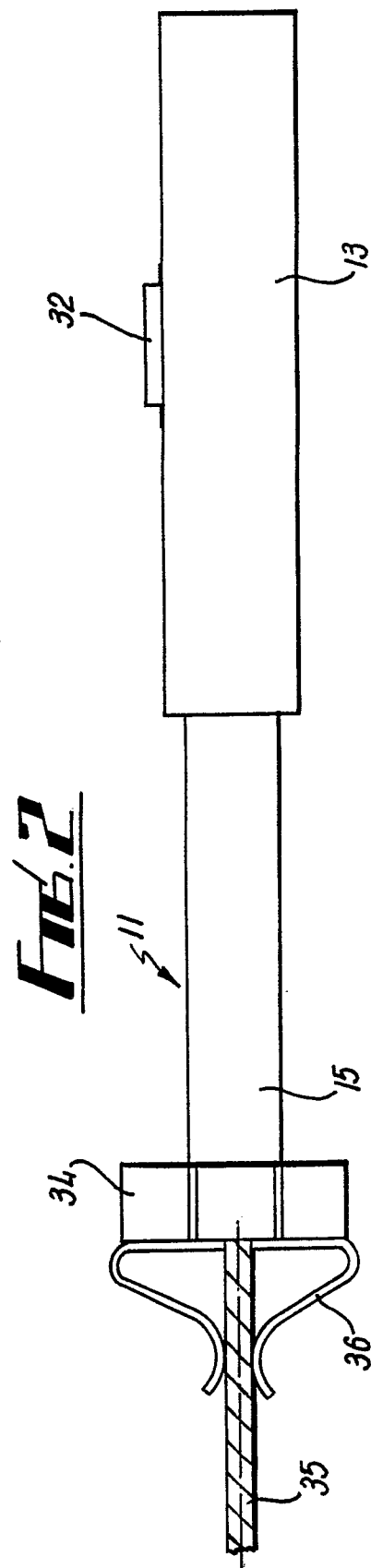
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File 1



**FILE 2**