Jan. 19, 1971 B. O'BYRNE 3,555,638

MACHINE FOR PRODUCING ENDLESS NEEDLED FELTS

Filed May 5, 1969 3 Sheets-Sheet 1

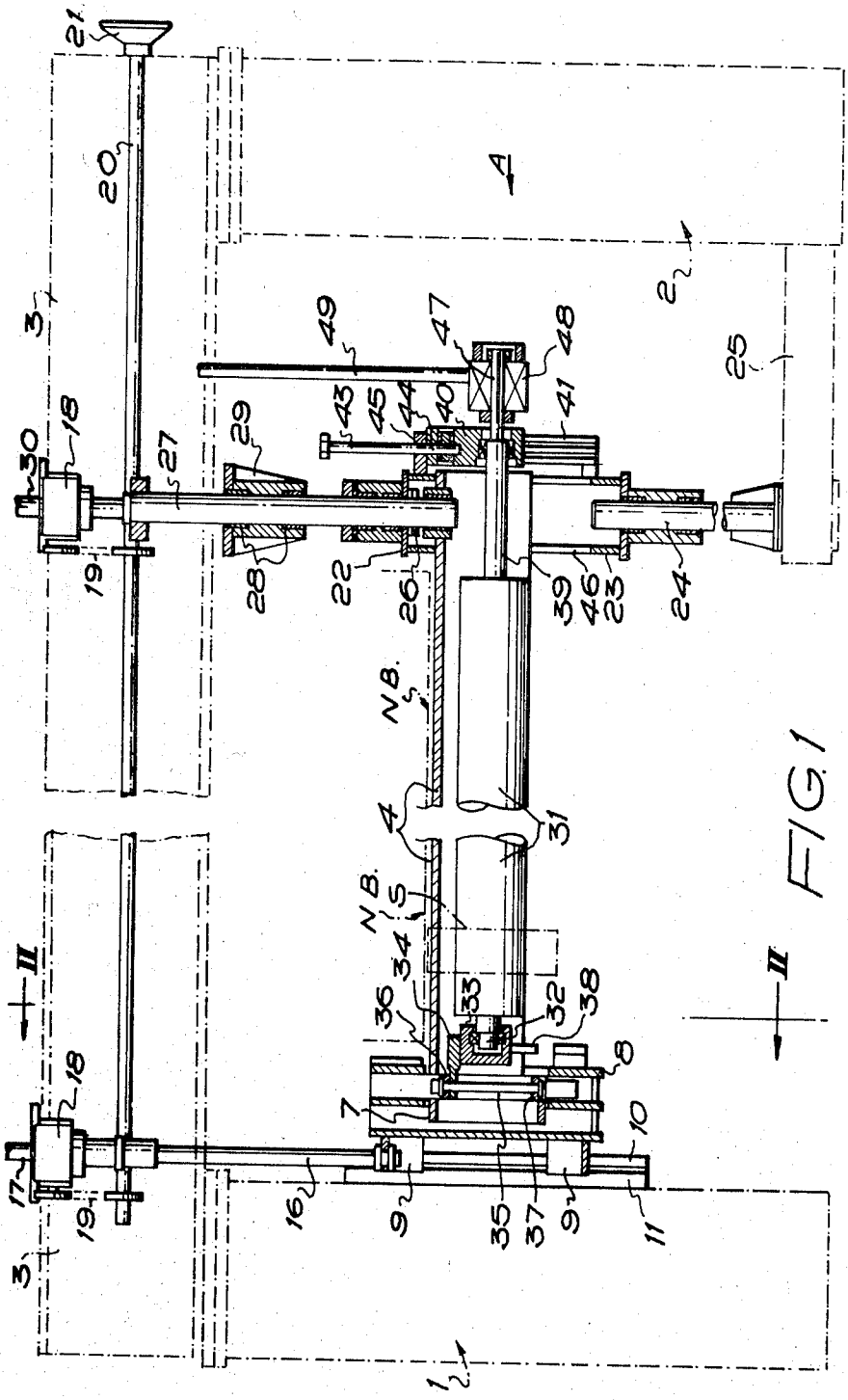


FIG. 1

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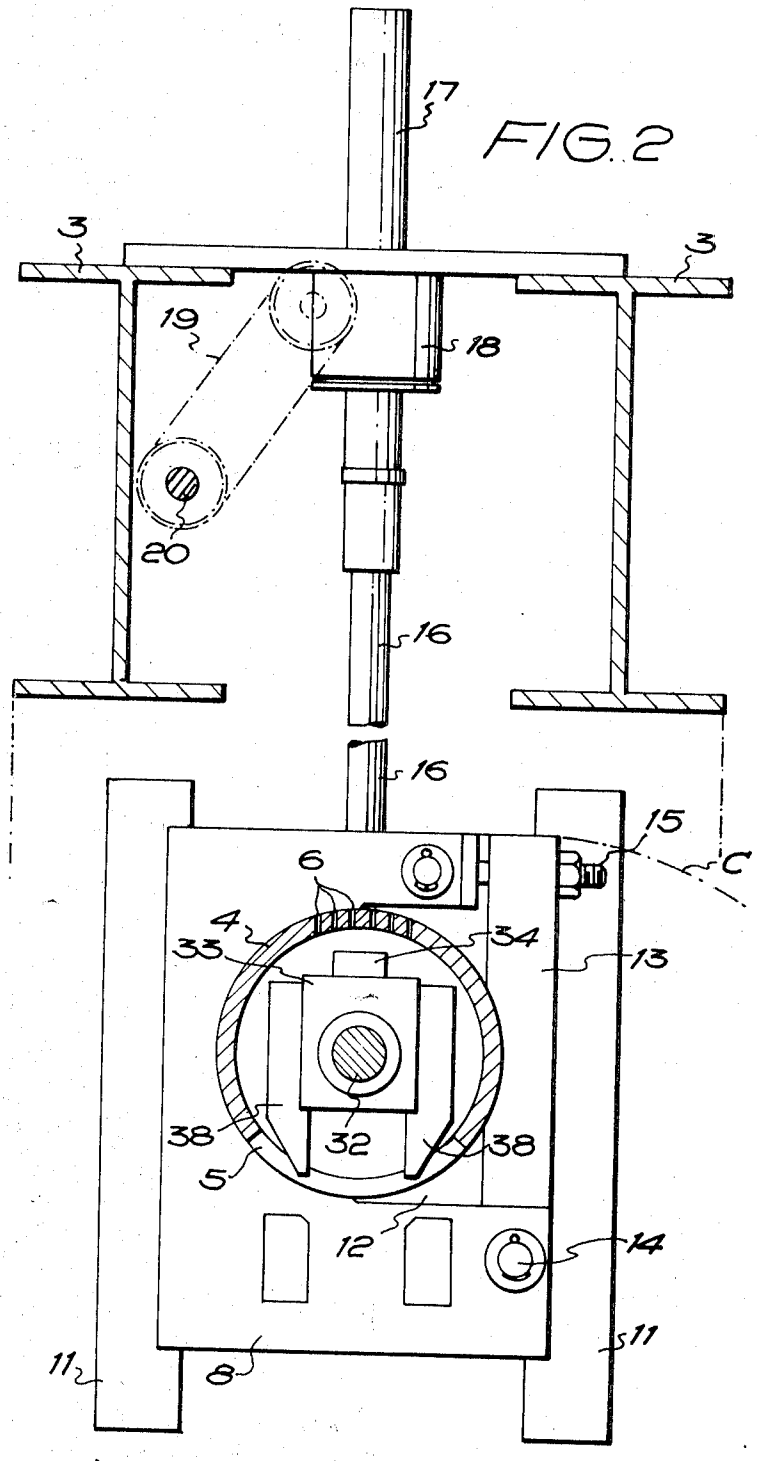


FIG. 2

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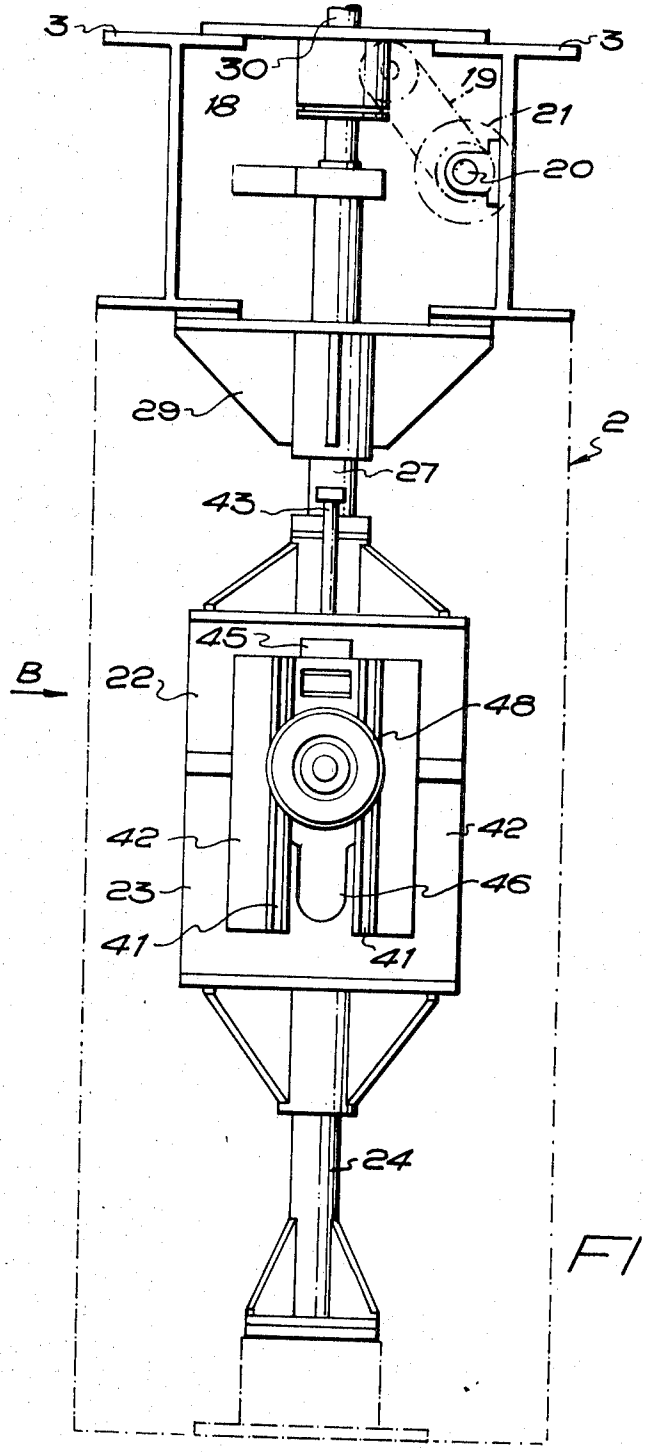


FIG 3

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MACHINE FOR PRODUCING ENDLESS NEEDLED FELTS

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Int. Cl. D04h 18/00
U.S. Cl. 28—4 4 Claims

ABSTRACT OF THE DISCLOSURE

In a needling machine for producing endless needled felt, particularly in the form of sleeves or tubes of comparatively small diameter, there is provided a needle bed and draw roller assembly including a curved needle bed with an internal draw roller mounted between supports as that this assembly can be opened at one end to apply a foundation sleeve over the bed and roller from that end and remove it also at that end after needling, the roller and bed being relatively adjustable towards and away from one another to permit each sleeve to be applied and removed and to tension the sleeve for needling. The machine also includes provision for moving the roller bodily out of the bed wholly or partially to deal with longer sleeves; provision for adjusting the bed and roller assembly vertically relative to the needle board; and provision for suspending the bed and roller assembly including its end supports from screw jacks mounted on the upper part of the machine frame.

This invention relates to a machine for producing endless needled felts.

It has for its particular object to provide improvements in a machine to produce such felts in the form of sleeves or tubes of a comparatively small diameter (say only 30 to 60 cms.) such as are used, for example, in the leather trade on seaming machines.

The machine to which this invention relates operates according to the well known principle of needling machines wherein the material to be needled is fed across a perforated needle bed and is punched by a set of needles mounted in a needle board which is guided for reciprocation through connections from power driven eccentrics or crank devices, the needle board and its operating means all being supported from the upper part of the machine frame. The needle board and its supporting and operating means will not be further described herein nor illustrated in the drawings, since the present invension relates to the needle bed and to the means for feeding the material thereover during the needling and the means for inserting and removing a base sleeve and the needled endless felt respectively into and out of the machine.

According to the invention there is provided a needle bed and draw roller assembly including a curved needle bed with an internal draw roller mounted between supports so that this assembly can be opened at one end to apply a foundation sleeve over the bed and roller from that end and remove it also at that end after needling, the roller and bed being relatively adjustable towards and away from one another to permit each sleeve to be applied and removed and to tension the sleeve for needling. The curved bed has apertures or recesses to cooperate with the needles of any suitable form of reciprocating needle board.

Further features of the invention include provision for moving the roller bodily out of the bed wholly or partially to deal with longer sleeves; provision for adjusting

the bed and roller assembly vertically relative to the needle board; and provision for suspending the bed and roller assembly including its end supports from screw jacks mounted on the upper part of the machine frame. These and other features of the invention will be more particularly pointed out in the following description.

In order that the nature of the invention and the manner of carrying the same into effect may be more clearly understood, the relevant parts of one construction of machine according to the invention and given merely by way of example will now be described with reference to the accompanying drawings wherein:

FIG. 1 represents a longitudinal central vertical cross-section in which the machine frame members are indicated only in outline by broken lines;

FIG. 2 represents a vertical section on the line II—II in FIG. 1; and

FIG. 3 represents an end elevation seen in the direction of arrow A.

As shown in these drawings the machine frame has two end standards **1**, **2** joined by two horizontal beams **3**, **3** and these beams support the vertically reciprocatable needle board and its operating means as already explained, the lowered position of the needle board being indicated by the broken line NB representing the tips of the needles.

The needle bed **4** is partly cylindrical in cross-section as shown in FIG. 2, extending around more than 180° and leaving a longitudinal gap **5** in its underside, and its upper portion is provided with several longitudinal rows of perforations **6** into which the needles enter during needling. What will hereinafter be called the free end of the needle bed is circular at **7** and is mounted in a bed support **8** which has lugs **9** vertically slidable in slideways **10** on two bed guides **11**, these guides being secured upon the end standard **1**. The bed support **8** has one open side **12** closable by a bed clamp **13** which is hinged at **14** and which can be held closed by a swivel eye bolt **15**.

The bed support **8** is carried on an extension shaft **16** of a screw jack **17** which is mounted on the beams **3**, **3** and which is operated through a worm gear box **18** and chain and chainwheel drive **19** from a jack-operating shaft **20** having its operating handle **21** at the other end of the machine.

The other end of the bed **4** is secured between upper and lower half-brackets **22**, **23** the lower one **23** being supported for vertical movement and horizontal angular movement on a guide and pivot spindle **24** mounted on a foot **25** of the end standard **2**. The upper half bracket **22** is suspended on a collar **26** secured on a lifting and pivot shaft **27** journalled in bearings **28** housed in a guide **29** secured to the beams **3**, **3**. This shaft **27** is secured to a second screw jack **30** which is mounted and operated in the same manner as that described for jack **17**, the shaft **20** and handle **21** being common to both jacks. It will be seen that by operating handle **21**, the bed **4** can be adjusted vertically towards or away from the needle board to adjust the degree of pentration of the needles into the material lying over the bed.

A draw roller **31** of a diameter small enough to pass through the gap **5** in the bed **4** has at one end an axle **32** supported for rotation in bearings in a bearing block **33** to which is secured an arm **34**. A roller adjusting screw **35** rotatably held in lugs **36**, **37** on the bed support is threaded through the arm **34** so that rotation of the screw moves the block **33** vertically between guides **38** for adjusting that end of the roller relative to the needle bed. The other end of the roller **31** has an axle **39** supported for rotation in bearings in a bearing block **40** which is vertically slidable in slides **41** in guides **42** secured to the brackets **22**, **23**. A roller adjusting screw **43** rotatably

anchored at **44** in the block **40** is threaded through an arm **45** secured to bracket **22** for adjusting that end of the roller relative to the needle bed, the axle moving in a slot **46** in the bracket assembly **22, 23**.

On an extension **47** of the axle **39** is mounted an indexing clutch **48** of any suitable kind arranged to be operated by a connecting rod **49** (not shown in FIG. 3) from the usual eccentric or crank mechanism which is mounted on the beams **3, 3** but which need not be illustrated as it is well known in this art.

The draw roller is roughened or covered with card clothing or other suitable material to enable it to grip the foundation sleeve, and the outer surface of the bed is polished or covered with an anti-friction material such as P.T.F.E. (polytetrafluorethylene).

With the above described construction of machine, when the clamp **13** is opened (as indicated by line C in FIG. 2) the free end of the bed **4** and roller **31** can be swung out about the pivot supports **24, 27** and with the roller in its upper position as shown in the drawings a foundation sleeve S (a portion of which is indicated in FIG. 1) of woven textile material or other suitable material can be slipped over the open ends of the bed and roller. The latter are then swung back and clamped and the roller is lowered by operation of the adjusting screws **35, 43** to tension the sleeve sufficiently to ensure that it will be moved across the bed when the roller is indexed. As the roller is indexed in timed relation to the reciprocation of the needle board, a sheet of felt material is fed in the direction of arrow B in FIG. 3 between the sleeve on top of the bed and the needles and needling proceeds until the sleeve has made one or more revolutions according to the desired thickness of the finished felt sleeve or tube. This latter can then be removed after raising the roller and swinging the bed and roller assembly out of its support.

Since the length of the bed is intended to be of the order of 2 to 3 metres, the angular movement of the roller axle extension **47** will be so small that it may readily be accommodated in the connections and couplings between the clutch **48** and the mechanism which operates the connecting rod **49**.

I claim:

1. In a machine for producing endless needled felts a needle bed and draw roller assembly comprising in combination a curved needle bed having apertures therein for passage of the reciprocating punching needles, a draw roller arranged to work within the curveature of said bed, means for driving said roller, means for supporting the ends of said bed and roller, means for disengaging said bed and roller from one of said supporting means to enable a foundation sleeve to be applied over said bed and roller from that end and to enable the needled felt to be removed also at that end, and means for adjusting said roller in a direction at right angles to its axis of rotation and towards and away from the apertured part of said bed to tension the sleeve for needling and to permit the sleeve to be applied and removed.

2. In a machine for producing endless needled felts the combination claimed in claim **1** and wherein said bed and roller extend horizontally and said bed has the form of a partial cylinder of more than 180° with a longitudinal gap on its underside, said roller having an overall diameter small enough to allow it to pass through said gap during its adjustment relative to said bed.

3. In a machine for producing endless needled felts the combination claimed in claim **1** wherein one of end supports includes vertical upper and lower pivot supports located respectively above and below the end of the bed and roller at which said driving means for the roller is connected and about which pivot supports the bed and roller are horizontally swingable, and wherein the other of said end supports includes clamping means for clamping the adjacent ends of the bed and roller in said support for needling and for unclamping said ends to permit the bed and roller to be swung free.

4. In a machine for producing endless needled felts the combination claimed in claim **3** wherein said support for the free ends of the bed and roller is mounted for vertical movement in guides secured to one end member of a frame of the machine and wherein said other end support is mounted for vertical movement upon said lower pivot support, said end support for the free ends and said upper pivot support being connected to screw jacks mounted on a beam structure forming a longitudinal member of said machine frame, said jacks having a common operating shaft extending longitudinally of the machine for adjusting said bed and roller as a whole vertically.

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