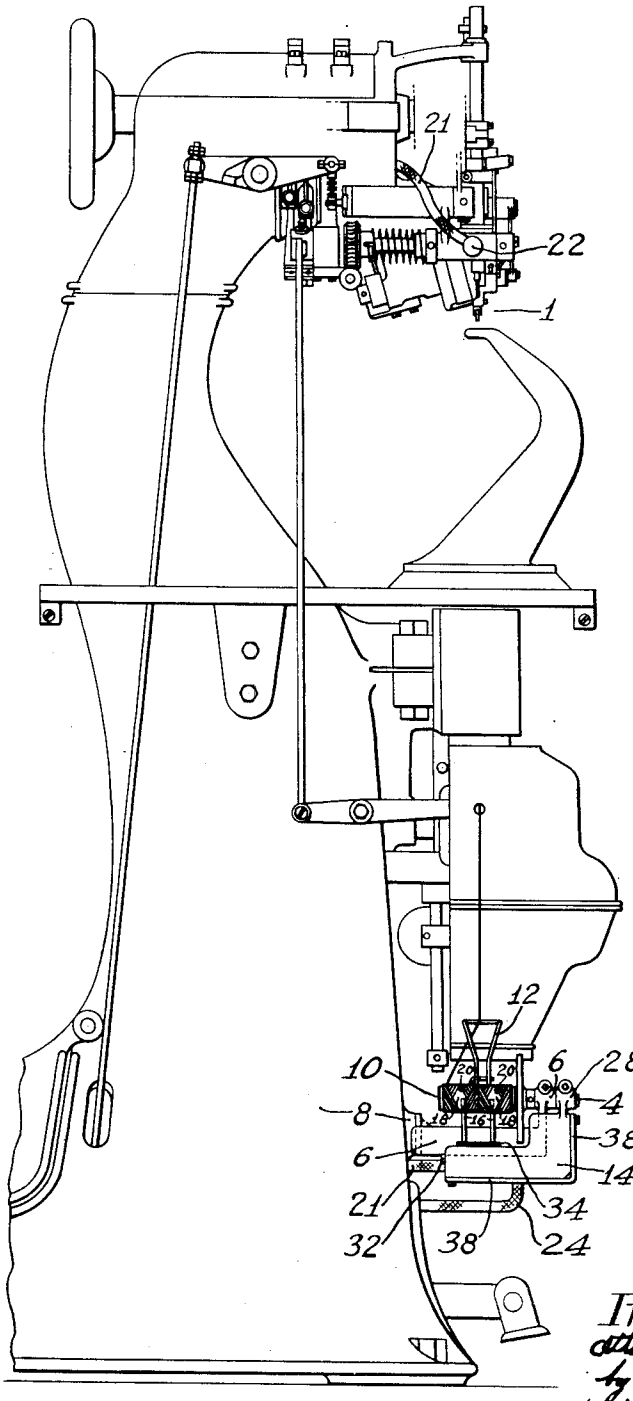
Aug. 17, 1943. O. R. HAAS 2,326,852

THREAD SUPPLY DEVICE FOR SHOE SEWING MACHINES

Filed July 25, 1939 2 Sheets-Sheet 1

Fig. 1



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Fig. 2

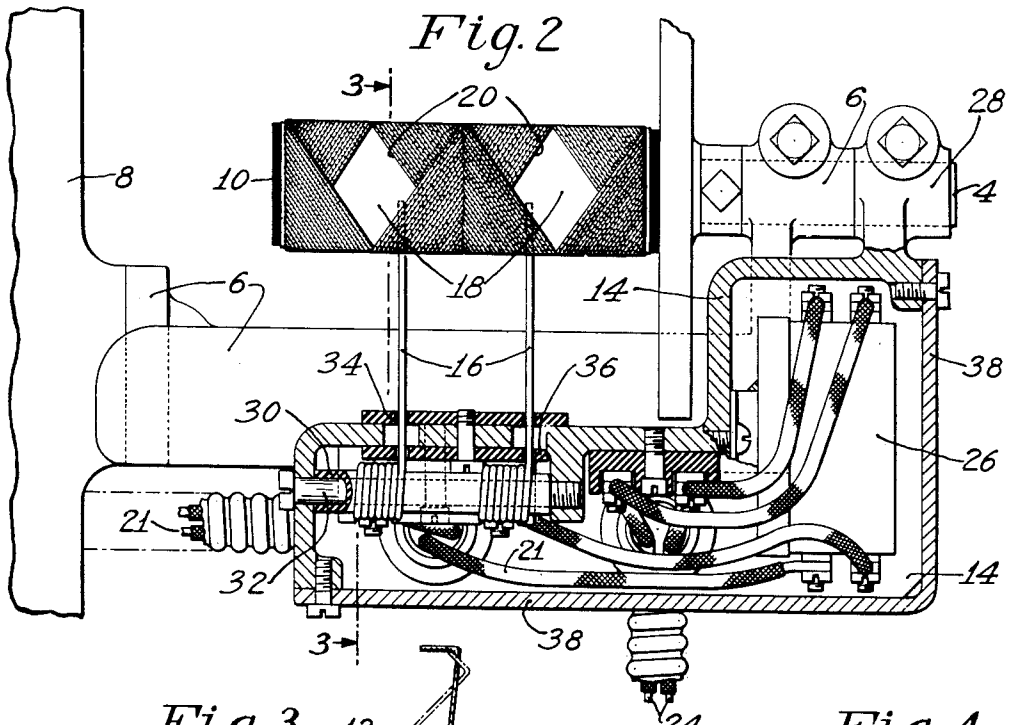


Fig. 3

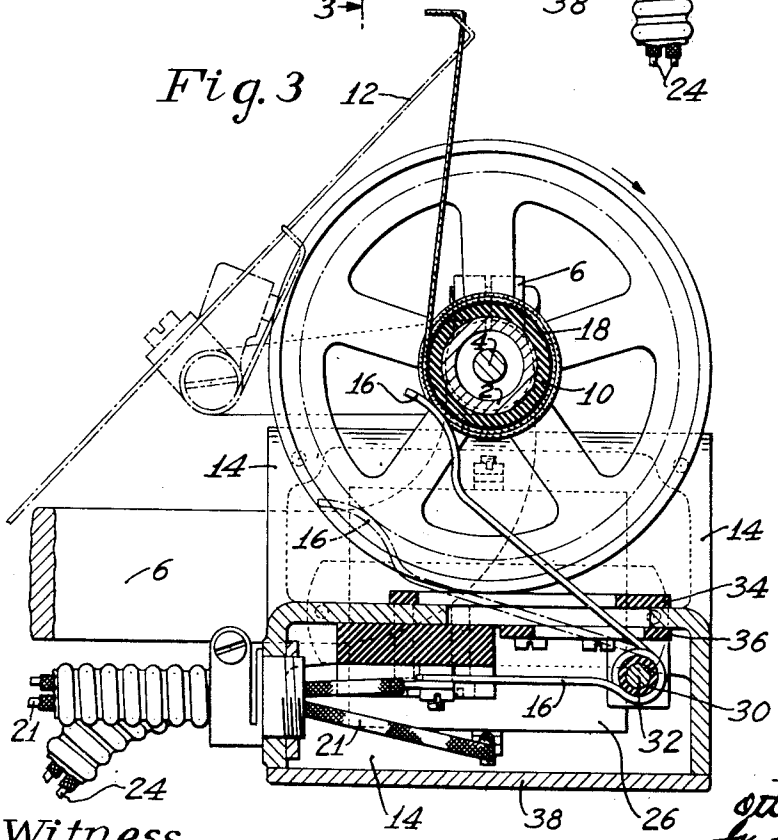
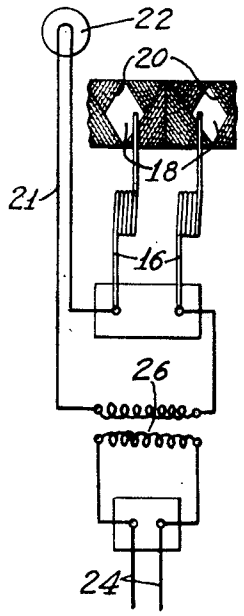


Fig. 4



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2,326,852

UNITED STATES PATENT OFFICE

2,326,852

THREAD SUPPLY DEVICE FOR SHOE SEWING MACHINES

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Application July 25, 1939, Serial No. 286,361

6 Claims. (Cl. 177—311)

The present invention relates to shoe sewing or other similar machines, and more particularly to improvements in thread supply devices for shoe sewing machines, which devices are not located conveniently for continuous inspection by the operator.

In a shoe sewing or other thread handling machine where the parts surrounding the point of operation are crowded or complicated, it is necessary to locate the supply or supplies of thread at a location remote from the point of operation. While such a machine is in use, an operator ordinarily faces the machine at a position where the supply of thread is not within his range of normal vision, giving his full attention to the proper presentation and change in position of the shoe relative to the stitch forming devices of the machine so that occasionally through inattention to the supply, the thread may become exhausted in the middle of a seam. Such an occurrence not only renders the seam unsightly, due to the discontinuity of thread, but requires complete rethreading of the machine before restarting.

The present invention has for its object to provide a simple and effective thread supply device for a sewing or other thread handling machine arranged to give a warning indication to the operator without distracting his attention from proper manipulation of the shoe being sewed, in advance of the time the thread becomes exhausted, so that the proper steps may be taken at the end of the seam to avoid discontinuity of thread in the middle of the next seam to be sewed. Thus, before the machine is brought to rest at the end of a seam or other operation, an indication will be given showing whether another complete operation may be finished without providing a new supply. Also complete rethreading of the machine may be avoided by attaching a new supply to the approaching end of thread and pulling the attached end through the guides and past the thread handling devices of the machine.

While the invention is illustrated as embodied in a shoe sewing machine in which the shoe is presented and its position changed while sewing wholly by the operator, in certain aspects the invention is of broader application and may be used advantageously in any machine requiring the use of a thread supply. In the broader applications of the invention, the thread supply is carried by a reel having the thread wound with diagonal layers, the successive turns of which cross each other to produce a diamond-shaped opening when the last layer of thread is reached, and to cause a warning indication, suitable means is arranged in alignment with the position at which the opening occurs. With this arrangement, the opening and alined means may be so adjusted relatively that the amount of thread remaining on the reel after the warning is given will be sufficient without a substantial surplus to complete a single shoe or other seam or a predetermined number of seams, the indication becoming of increasingly greater duration as the thread end approaches. Thus with a little experience the operator is enabled to use substantially all of the thread on the reel without waste and without frequent or inconvenient inspection of the thread supply.

Other features of the invention including a new and improved enclosing casing for electrical contacts and connections in a thread supply indicating device which renders the device readily applicable to present existing thread supply devices without difficult or complicated changes, and other novel combinations and arrangements of parts hereinafter described and claimed will be readily understood by those skilled in the art from the following description and claims taken with the accompanying drawings in which Figure 1 is a view in side elevation of a portion of a machine embodying the features of the present invention; Figure 2 is a view in elevation and partly in section of a thread supply device employed on the machine; Figure 3 is a sectional view taken along the line 3—3 of Figure 2; and Figure 4 is a diagrammatic view of the circuit connections in the device.

The machine illustrated in the drawings is a lockstitch McKay type shoe sewing machine having stitch-forming devices including a presser-foot, work supporting horn, feed point, shuttle and other regular cooperating thread handling parts, generally designated by the numeral 1, which are located in more or less crowded relation at and surrounding the sewing point in the machine. The machine is so designed that when the operator presents a shoe to the machine he stands close to and in front of the machine, the shoe being supported just below the level of his eyes. As the shoe is being sewed, it is tipped and turned by the operator about the work supporting horn to change the position according to the shape of the shoe, the operator giving his whole attention to the positioning movements and the operations of the stitch-forming devices. Due to the crowded condition of the stitch-forming devices, it is customary to locate the supply of sewing thread close to the floor out of the normal range of vision for the operator while sewing a

shoe. As a consequence, the supply of thread may become exhausted before the operator notices the fact so that a break in the thread occurs in the middle of a seam. In addition to the annoyance of such occurrence, a substantial loss of time and effort results when rethreading the machine.

The thread supply device, shown more particularly in Figs. 2, 3, and 4 of the drawings, is similar to that disclosed in U. S. Letters Patent to Winkley No. 1,909,157 dated May 16, 1933 and, to support the thread supply, the device is provided with a hollow hub or reel 2 which is mounted for free rotation upon a horizontal spindle 4 secured at one end to a frame 6 mounted on the base portion 8 of a shoe sewing machine. The other end of the spindle is unobstructed so that a hollow fibre tube 10 containing a supply mass of electrically non-conducting thread may be slipped freely on and off the reel 2. The supply mass of thread is wound on the tube 10 in diagonal layers, the successive turns of which alternately cross each other along lines extending around the outer surface of the layers. From the tube 10 the thread is led radially and extends over a light wire loop 12 shown in dot-dash lines of Figure 3, which loop acts in keeping a uniform tension on the thread as the reel is rotated to supply the demand of the machine.

To relieve the operator for the present machine of the necessity of making frequent thread supply inspections, according to the present embodiment of the invention, there is clamped to one end of the spindle 4 adjacent the frame 6 a casing 14 containing electrical equipment including a pair of yielding contact wires 16 arranged to drag along the outer layers of thread on the supply reel and the tube 10, being composed of electrical insulating material, has its outer surface wrapped with a sheet of thin electrically conducting metal foil 18 before winding on the thread supply. When a tube containing a fresh supply of thread is applied to the reel 2, the contact wires 16 are moved radially away from the reel 2 and rest upon the outer layers of thread. As the thread on the reel is used up, the contact wires drag along the outer layers and move radially inwardly. When the last layer of thread on the tube is reached diamond-shaped openings 20 begin to appear between the outer and inner turns of the diagonal windings, thus uncovering correspondingly shaped portions of the foil 18 through the openings. As the reel continues to turn, the contact wires which are arranged in alignment with the openings 20 register therewith and engage the foil 18, thus exposed, completing a circuit 21 including a warning light 22. The warning light is suitably mounted on a part of the machine in plain view of the operator while presenting a shoe to the stitch-forming devices, and is energized by a source of alternating current 24 connected with a transformer 26 for reducing the potential to a safe voltage.

At the time the foil 18 is first exposed to the contacts 16 there is a substantial length of thread still remaining on the supply tube so that the seams in one or more shoes may be completed before exhausting the thread. From the time the warning light is first energized, it is lighted and extinguished alternately as the reel rotates, first for short periods when the openings 20 are relatively small and then for progressively increasing periods of greater length when the openings enlarge in size. By the length of time during which the light 22 is energized, the operator is able to estimate the amount of thread remaining on the reel and, after a little experience, it is possible for the operator to use substantially all of the thread contained on the supply tube 10 before substituting a new supply without taking the trouble to inspect the supply after each seam is sewed, the flashing of the warning light 22 acting as a constant reminder of the approaching end of thread.

In order to facilitate the application of the electrical contact housing 14 to present existing thread supply devices, without substantial structural changes in the devices, the housing is formed with an upstanding clamp lug 28 by means of which it is secured to and supported entirely by the end of the spindle 4. By securing the housing to the spindle 4, the proper operative relation between the supply reel and the contacts may be maintained, regardless of the shape of the frame 6 or the manner of mounting the reel on the machine. The contact wires themselves act as springs, being wound in coils about an insulating sleeve 30 supported on a pin 32 mounted within the casing 14 and the spacing between the contacts is maintained by slotted insulating plates 34, 36 secured outside and inside the casing respectively. The slots in the plates 34, 36 are so spaced that the contact wires drag along the outer layer of thread a little to one side of the centers of the openings formed as the final end of the thread supply approaches.

As illustrated in Figure 1, the casing 14 is substantially L-shaped and formed with an L-shaped cover 38 secured to the main body of the casing. The transformer 26 is mounted within the arm of the casing which is at right angles to the spindle 4 and nearest the supporting lug 28 the contact wire supporting structure including the pin 32 being mounted in the other arm of the casing which is parallel to the spindle. By so arranging the parts a minimum amount of space is occupied radially of the spindle so as not to interfere with other parts of the sewing machine and the space occupied by the transformer 26, being close to the spindle, renders the whole device compact as well as easily accessible for adjustment or replacement of parts.

The nature and scope of the invention having been indicated, and a particular embodiment having been described, what is claimed is:

1. A thread supply device having, in combination, a reel for rotatably supporting a mass of thread wound in diagonal layers, the successive turns in which alternately cross each other to form a diamond-shaped opening when the last layer of thread is reached, and means located in alignment with the position at which said opening occurs and actuated to enter the opening and cause a warning indication to be given a substantial length of time in advance of the approaching end of thread contained on the reel.

2. A thread supply device having, in combination, a reel for rotatably supporting a mass of electrically non-conducting thread wound in diagonal layers, the successive turns in which alternately cross each other to form a diamond-shaped opening when the last layer of thread is reached, a covering of electrically conducting material on the reel and a yielding contact arranged in alignment with the position on the reel at which said opening occurs to drag across the layers of thread and to complete an indicating circuit with said covering a substantial length of

time in advance of the approaching end of thread contained on the reel.

3. A thread supply device having, in combination, a reel for rotatably supporting a mass of electrically non-conducting thread wound in diagonal layers, the successive turns of which alternately cross each other to form diamond-shaped openings when the last layer of thread is reached, a covering of electrically conducting material on the reel, and yielding contacts arranged in alignment with different positions at which said openings occur alternately to drag across the layers of thread and to engage the conducting covering, said diagonal layers of thread being applied uniformly to cause said contacts to complete an indicating circuit simultaneously a substantial length of time in advance of the approaching end of thread contained on the reel.

4. A thread supply device having, in combination, a reel for rotatably supporting a mass of thread wound in diagonal layers, the successive turns in which alternately cross each other to form a diamond-shaped opening when the last layer of thread is reached, yielding means arranged in alignment with the position at which said opening occurs to drag across the layers of thread, and an indicating device having an electrical circuit arranged to be completed by the yielding means whenever the opening registers therewith.

5. A thread supply device having, in combination, a reel for rotatably supporting a mass of electrically non-conducting thread wound in diagonal layers, the successive turns in which alternately cross each other to form a diamond-shaped opening when the last layer of thread is reached, electrically conducting means on the reel, and a contact wire located in alignment with the position at which said opening occurs and yieldingly pressed against the thread to enter the opening and cause a warning indication to be given a substantial length of time in advance of the approaching end of the thread contained on the reel.

6. In a thread supply device for a shoe sewing machine having stitch forming devices to which the shoe is presented and about which the position of the shoe is changed by an operator, and a diagonally wound sewing thread supply rotatable under the tension of thread and arranged out of the operator's normal range of vision while presenting and changing the position of the shoe relatively to the stitch forming devices, the combination with an electrical signal mounted on the machine close to the point of operation of the stitch forming devices, and means including contacts held apart by the presence of more than a predetermined amount of thread on the supply and located in alignment with openings in a diagonal layer of thread to cause a circuit to be closed when the thread falls below a predetermined amount, said circuit being connected to the signal to actuate the signal during progressively increasing periods of time in each rotation of the remaining diminishing supply as the amount of the supply is reduced.

OTTO R. HAAS.