

United States Patent

Sturges et al.

[15] 3,636,901

[45] Jan. 25, 1972

[54] NEEDLE-POSITIONING ATTACHMENT FOR A SEWING MACHINE

[72] Inventors: Nigel Sturges, Chatham; Leonard Charles Nutton, Rochester, both of England

[73] Assignee: Sewprima Limited, Brompton, Gillingham, Kent, England

[22] Filed: Feb. 24, 1970

[21] Appl. No.: 13,657

[30] Foreign Application Priority Data

Oct. 29, 1969 Great Britain 52,949/69

[52] U.S. Cl. 112/219 A

[51] Int. Cl. D05b 69/22

[58] Field of Search 112/219, 219 A, 220, 67, 87

[56] References Cited

UNITED STATES PATENTS

3,114,340 12/1963 Hedegaard 112/219 A

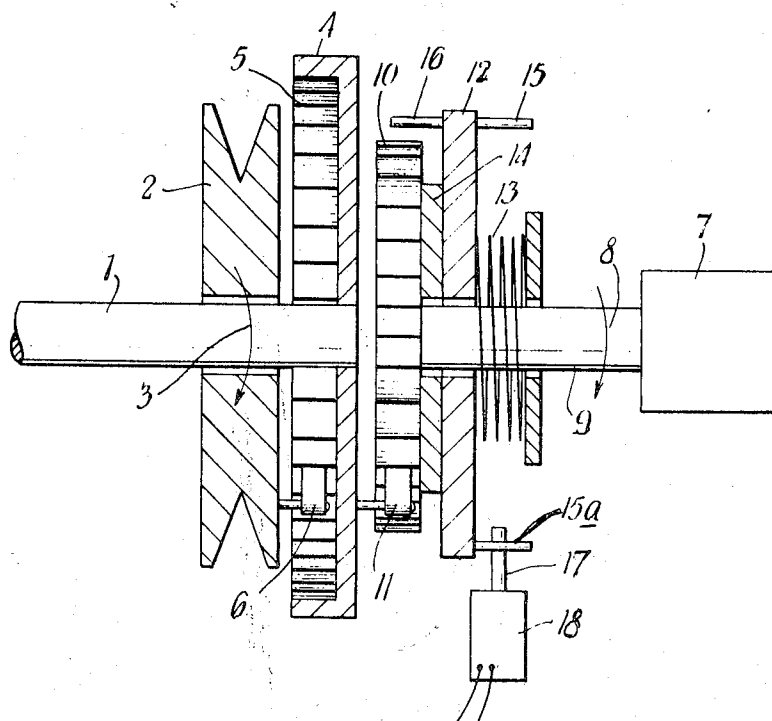
2,604,062	7/1952	Rich.....	112/219 X
3,482,538	12/1969	Hayashi et al.....	112/219 A
2,836,276	5/1958	Schwab et al.....	112/219 A X
2,159,722	5/1939	Bedard.....	112/219 A
3,503,352	3/1970	Peterson.....	112/219 A

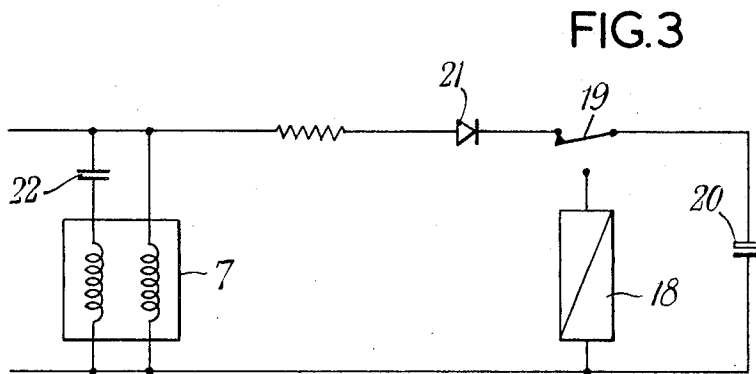
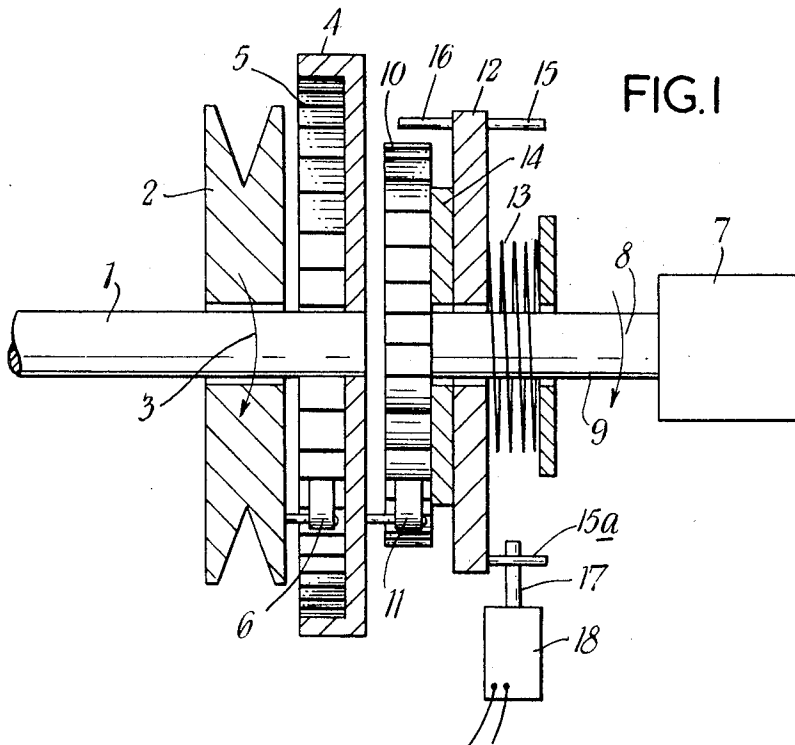
Primary Examiner—H. Hampton Hunter
Attorney—Bacon & Thomas

[57] ABSTRACT

A needle-positioning attachment for a sewing machine having a main drive spindle for reciprocating a needle, including a main drive wheel connected to the main drive spindle for rotation in one sense with overrun, a secondary drive motor continuously driving a secondary drive spindle which, through coupling means, drives the main drive wheel; and a selector device which is operatively at rest whereby the secondary drive spindle rotates within said device and drives the main drive wheel to a stop position when the drive from the main drive motor ceases.

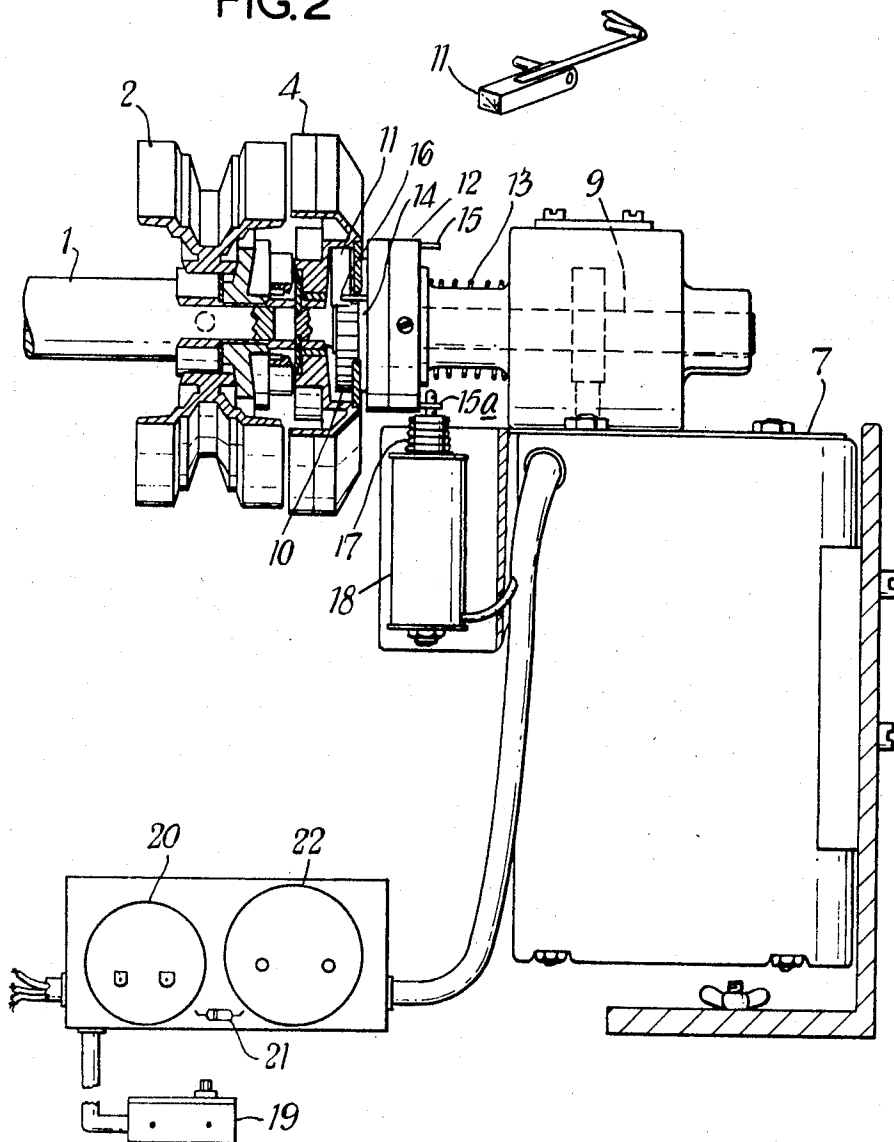
3 Claims, 3 Drawing Figures





INVENTORS
 NIGEL STURGES
 LEONARD CHARLES NUTTON
 BY *Bacon & Thomas*
 ATTORNEYS

FIG. 2



INVENTORS
 NIGEL STURGES
 LEONARD CHARLES NUTTON
 BY
Bacon & Thomas
 ATTORNEYS

NEEDLE-POSITIONING ATTACHMENT FOR A SEWING MACHINE

This invention relates to a needle-positioning attachment for a sewing machine.

Conventional sewing machines used in the commercial production of garments have a drive spindle which passes horizontally along the length of the machine and at one end operates the mechanism for reciprocating the needle and at the other end is provided with a pulley wheel over which passes a belt drive from an electric motor. This pulley wheel is normally splined on to the drive spindle for rotation therewith. The motor normally has a built-in brake which is capable of being disengaged by movement of a treadle, further movement of the treadle energizing the motor to effect the drive.

It is frequently necessary during the stitching of a garment for the operator to stop the machine to adjust the position of, or carry out some other operation on, the workpiece, and it may be necessary for the needle to be in the lowered position for this other operation to be effected. The position of the needle will depend on the operation to be carried out and in some instances the needle must be in the raised position, for example, when the workpiece is to be removed from the machine. However, it may well be that when the machine has been brought to rest, the needle is not in the correct position for this other operation to be performed and the operator has to make slight adjustment to the needle position. On some machines, this is done by rotating the pulley wheel by hand by the appropriate amount. More recently, automatic needle positioners have been proposed but generally these are of a complicated nature and require considerable maintenance and also require the operator to carry out an operation, for example, the depression of a switch, whereby the needle will be further driven to the raised or lowered position.

It is the main object of this invention to provide a needle-positioning attachment for a sewing machine which, when in operation and when set by the operator, will automatically move the needle to the raised or lowered or other desired position automatically as soon as the main drive to the needle is disconnected.

According to the present invention there is provided a needle-positioning attachment for a sewing machine having a main drive spindle which is connected to reciprocate the needle, said main drive spindle being driven from a main drive motor, including a main drive wheel connected for rotation with the main drive spindle and driven in one sense by the main drive motor and capable of overrun when the drive from the main drive motor ceases, a secondary drive motor adapted continuously to drive a secondary drive spindle which, through coupling means, is adapted to drive the main drive wheel in said one sense when the drive from the main drive motor ceases; and a selector device adapted to be frictionally driven by the secondary drive spindle to a stop position, said selector device including latch means which disengages the coupling means from driving the main drive wheel when the selector device is in the stop position so that the needle will be brought to rest in a predetermined position.

The invention also includes a needle-positioning attachment as aforesaid in which the selector device includes two abutments each of which is capable of contacting a releasable stop so that the needle may be brought to rest selectively in one of two positions. Conveniently, the said stop may be provided by the movable armature of a solenoid.

The invention also includes a needle-positioning attachment as aforesaid in which the coupling means includes a ratchet wheel mounted for rotation with the secondary drive spindle and a spring-loaded pawl pivotally mounted on the main drive wheel and adapted to engage the ratchet wheel. Conveniently, the said latch means may comprise a movable pin in a stopped position to disengage the pawl from the ratchet wheel.

The invention will now be more particularly described, by way of example only, with reference to the accompanying drawings, in which:

FIG. 1 is a diagrammatic representation of mechanism in accordance with the invention;

FIG. 2 is a part-sectional side elevation of mechanism in accordance with the invention; and

FIG. 3 is a wiring diagram.

Referring first to FIG. 1, there is shown a main drive spindle 1 of a sewing machine which is connected to reciprocate the needle in known manner. Freely rotatable on the main drive spindle 1 is a main drive pulley wheel 2 which is rotated in the sense of arrow 3 by a belt from a main drive motor (not shown). Splined or otherwise fixed for rotation with main drive spindle 1 is a main drive wheel 4 which is driven in one sense only by the pulley wheel 2 and is capable of overrun when the drive from pulley wheel 2 ceases. Various means may be provided for achieving this drive and overrun and in FIG. 1, purely for illustration, there is shown the main drive wheel 4 provided with internal teeth 5 engaged by a pawl 6 pivotally mounted on the pulley wheel 2. Preferably, instead of the pawl and ratchet drive a drive with infinite variation of the position between pulley wheel 2 and main drive wheel 4 will be utilized, for example, by the use of wedged friction rollers.

A secondary drive motor 7 continuously rotates, in the sense of arrow 8, a secondary drive spindle 9 which has affixed to it for rotation therewith a ratchet wheel 10. This ratchet wheel 10 has teeth on its periphery which are engaged by a pawl 11 pivotally mounted on main drive wheel 4. The secondary drive motor 7 is therefore capable of driving the main drive spindle 1 in the same sense as the main drive motor. The secondary drive motor, however, will drive through reduction gearing so that the main drive motor will drive the main drive spindle at a much faster speed than the secondary drive motor.

Freely mounted for rotation on secondary drive spindle 9 is a selector wheel 12 which is urged by spring 13 towards ratchet wheel 10, there being a friction drive washer 14 therebetween. Thus, rotation of ratchet wheel 10 frictionally drives the selector wheel 12 through washer 14 when plunger 17 is disengaged.

Selector wheel 12 is provided with a pin 15 and positioned within the path of movement of the pin 15 is a stop 17 which comprises the movable armature of a solenoid 18. One or two pins 15 and/or 15a may be provided depending on whether one or two stop positions are desired selectively to stop the needle. The selector wheel 12 also carries a main drive wheel pawl disengaging pin 16 adapted to contact pawl 11 and move it out of engagement with ratchet wheel 10.

The attachment operates in the following manner.

During operation of the sewing machine, the main drive pulley wheel drives the main drive spindle 1 via pawl 6 engaging ratchet 5 and thereby driving main drive wheel 4 in the sense indicated by arrow 3. During this time, the secondary drive motor 7 is continuously driving secondary drive spindle 9 and therefore ratchet wheel 10 is being driven but at a much slower speed than the speed of rotation of main drive wheel 4. The speed of rotation of main drive wheel 4 keeps the pawl 11 out of engagement with ratchet wheel 10 due to centrifugal force and a spring which urges pawl 11 towards the ratchet wheel 10 must be light enough to permit the centrifugal force to move the pawl 11 out of engagement with ratchet wheel 10 when main drive wheel 4 is rotating during normal use of the sewing machine.

As soon as the operator stops the machine by applying the brake, rotation of main drive pulley wheel 2 will cease and main drive wheel 4 will slow down sufficient for pawl 11 to engage ratchet wheel 10, the centrifugal forces now being no longer large enough to overcome the spring pressure urging pawl 11 into contact with ratchet wheel 10. Unless the operator desires the needle to stop in a different position from previously, the solenoid stop pin 15 will already be in contact with stop 17. The secondary drive motor 7 in driving secondary drive spindle 9 rotates ratchet wheel 10 and thereby the pawl 11 until the pawl 11 strikes the pawl disengaging pin 16 whereupon the drive from ratchet wheel 10 to wheel 4 will be disconnected. Rotation of the main drive spindle will immediately cease and the needle will come to rest in the desired position.

Unless solenoid 18 is then operated to withdraw the stop 17 and permit the pin 15a to move whereby a further pin 15 will engage stop 17, then, on further drive of the machine and applying the brake, the needle will come to rest in precisely a similar position.

With reference to FIG. 2, in which like parts to the arrangement shown in FIG. 1 have been given like reference numerals, it will be seen that the selector wheel 12 has two solenoid stop pins 15 and 15a, one being so positioned that the needle will come to rest in the raised position and the other being so positioned that the needle will come to rest in the lowered position. If it is desired for the operator to change the position in which the needle comes to rest, the operator will depress a microswitch 19 which causes a condenser 20 to discharge into the coil of solenoid 18 causing it to pulse and thereby withdrawing the stop 17 for a short time sufficient to permit stop pin 15a to pass the stop 17. Because of the continuing rotation of ratchet wheel 10, the friction drive washer 14 will engage with the selector wheel 12 and cause it to rotate until the other solenoid stop pin 15 contacts the stop 17. When the microswitch 19 is released, a changeover contact causes current flowing through a half-wave rectifier 21 to recharge the condenser 20. The circuitry is shown in the wiring diagram of FIG. 3. If a single phase motor is employed, a starter condenser 22 will be provided.

We claim:

1. In a needle-positioning attachment for a sewing machine having a main drive spindle for driving a reciprocable needle carrier, the improvement comprising
 - a main drive wheel adapted to be connected for rotation with said main drive spindle,
 - first coupling means connecting said main drive wheel with said main drive spindle whereby said main drive wheel

may be driven in one direction by said main drive spindle and capable of overrun when the drive from the main drive spindle ceases,

- a secondary drive motor,
- a secondary drive spindle continuously driven by said secondary drive motor,
- second coupling means connecting said secondary drive spindle with said main drive wheel whereby said main drive wheel is driven in said one direction when the drive from the main drive spindle ceases, and
- a selector device adapted to be frictionally driven by said secondary drive spindle to a stop position, said selector device including
 - latch means which disengages said second coupling means from driving said main drive wheel when said selector device is in the said stop position,
 - two spaced abutments and
 - a releasable stop positioned to be contacted selectively by either of said abutments, said releasable stop including a solenoid having a movable amature whereby said main drive spindle may be brought to rest selectively in one of two predetermined positions.
2. In a needle-positioning attachment according to claim 1, the improvement comprising said second coupling means including
 - a ratchet wheel mounted on said secondary drive spindle for rotation therewith, and
 - a spring-loaded pawl pivotally mounted on said main drive wheel and adapted to engage said ratchet wheel.
3. In a needle-positioning attachment according to claim 1, the improvement comprising said latch means including a pin movable to disengage said second coupling means.

* * * * *