(No Model.)

F. H. RICHARDS.

DRIVING MECHANISM.

No. 540,842. Patented June 11, 1895.

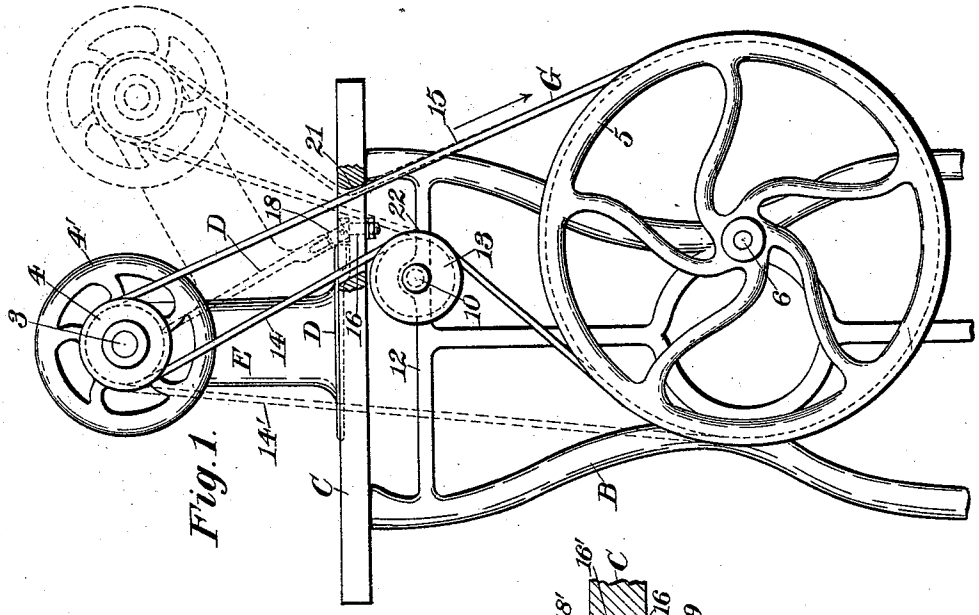

Fig. 1.

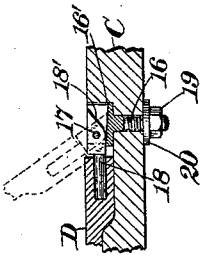

Fig. 3.

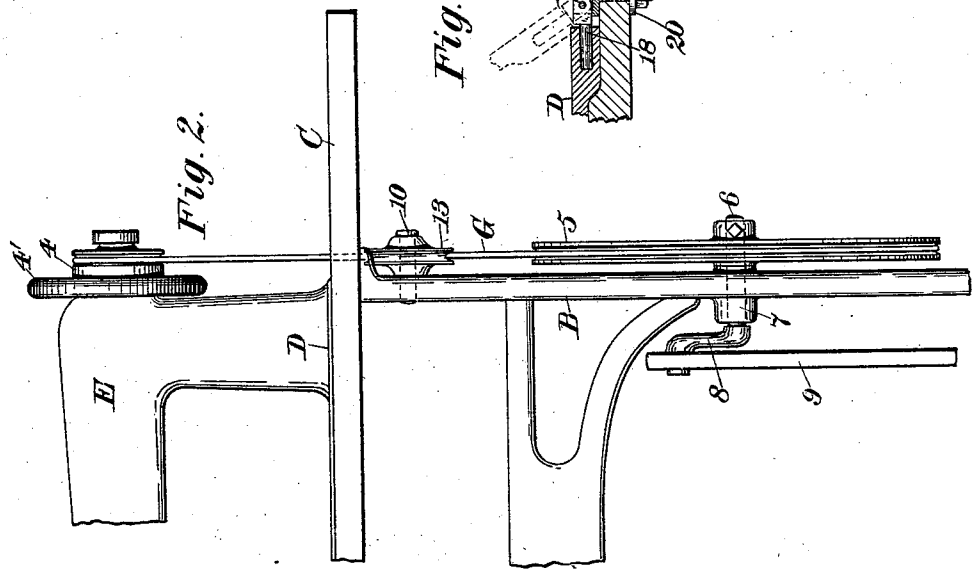

Fig. 2.

Witnesses.

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DRIVING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 540,842, dated June 11, 1895.

Application filed August 18, 1894. Serial No. 520,684. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Driving Mechanism, of which the following is a specification.

This invention relates to improvements in driving-mechanism for sewing-machines, the object being to provide a mechanism of this class in which the driven machine may be at any time readily shifted from position for use into position for inspection without throwing off the driving-belt.

In the drawings accompanying and forming a part of this specification, Figure 1 is a side elevation of portions of a sewing-machine embodying my invention. Fig. 2 is a front elevation of the same. Fig. 3 is a detail illustrating the pivotal connection of the auxiliary and main frames of the machine.

Like characters designate like parts in all of the figures.

According to my present invention I mount the frame carrying the driven-mechanism, (which said frame I term the "auxiliary frame,") pivotally upon the main frame or standard of the machine, so that said auxiliary frame has a determined arc of movement. A rotary, driving-member, of relatively large diameter, is journaled upon said main frame, and is located remote from the pivot of the auxiliary frame, and is connected, by means of a driving-band, with a rotary driven-member journaled upon the auxiliary frame and remote from the pivot thereof. A guide, which may be a fixed portion of the main frame, is placed contiguous to the rearward side of the rearward or draft run of the driving-band, and adjacent to, and in the rear of, the pivotal axis of the auxiliary frame; while a second guide, such as a roller or wheel, is carried by the main frame and located contiguous to the forward side of the forward run of the driving-band, said guide-wheel being also disposed adjacent to, and in advance of, the pivotal axis of the auxiliary frame, and in such a manner that its band-engaging face is, in all positions of the auxiliary frame, in the rear of that common tangent to the forward band-engaging faces of the rotary driving and driven-members which corresponds to the positions of said rotary members, so that the upper and lower portions of the forward run of the driving-band are constantly carried by the guide-wheel at an angle to each other and in the rear of such common tangent, and each of the guides maintains a point in its respective run in substantially fixed relation to the axis of the auxiliary frame, and adjacent to, but at opposite sides of, said axis, and permits the outward swinging of the upper portion of each of said respective runs of the driving-band relatively to the lower portion of such corresponding run, the driving-band thus being positively controlled in all positions of the auxiliary frame, whereby the movable or auxiliary frame may be tilted, with respect to the main frame, without throwing off the driving-band or disengaging the same from its guide-wheel.

In the embodiment of my invention herein shown and described B designates a standard, forming one end of the frame of the machine, and C the table or support for the bed-plate and operating parts of the machine. This bed-plate is shown at D, as having the standard or arm E mounted thereon, and as carrying, in a suitable-bearing, the operating-spindle or driven-member 3. A band-wheel is shown at 4 as mounted upon the spindle 3, in the well known manner, and as receiving motion from the driving-wheel or member 5 through the medium of a belt or band G. A hand-wheel 4′ is provided also, for the purpose of starting the machine. The driving-wheel is shown as secured to the end of the shaft 6, which is journaled at the said end to the bearing 7 and receives motion, through a crank 8 and a connecting-rod 9, from a treadle (not shown) in the usual way.

Upon a cross-piece 12, forming part of the main-frame, is mounted a guide or idler for the belt, which guide is here shown in its preferred form as a grooved-wheel or friction-roller 13, revoluble upon a stud or pin 10 carried by said cross-piece. As shown in Fig. 3, it will be seen that the driving and driven-wheels and the guide-roller are all in line with one another, and that each is preferably formed with a peripheral groove or channel to prevent running off of the belt when the machine is in operation. Said guide or roller

is shown as engaging the run 14 of the belt, about mid-way between the journals of the driving and driven-wheel, respectively, of the machine, but it may be placed at any other point along this run that will prevent tightening of the belt when the axis of the driven-shaft is shifted, and the driven machine or needle-carrying-frame is tilted to the rear as shown in Fig. 1. Said guide-roller 13 is here shown as placed in front of the run 14, and is so disposed that the line of movement of said run is substantially parallel with that of the draft-run 15 of the belt. In this position of the guide-roller a much larger belt-surface will be constantly engaged by the grooved driven-wheel 4, than is the case with a belt directly connected from a large driving-wheel to a smaller driven-wheel.

In Fig. 1, I have shown at 14′, in dotted lines, the path of movement of the run 14 in machines as ordinarily constructed. Here the belt is in contact with about one-half of the peripheral surface of the driven-wheel; while, when the guide-roller is in position, as shown in said figure, with the run 14 substantially parallel with the run 15, a considerably greater wheel-surface is engaged by the belt, and the adhesion between the two members correspondingly increased. Owing to this fact, and to the further fact that the movement of the belt is not seriously retarded by the guide-roller 13, I am enabled to run the belt at a much lower tension than is ordinarily employed in this class of machines and I thereby lengthen the life of the belt and reduce the strains upon the moving parts of the mechanism.

In the preferred form of my invention, I have shown the bed-plate D as pivoted to the table or support C by connections which permit the ready removal of the bed-plate, and the operating mechanism supported thereon, from said table C. A screw-threaded post or bolt 16 is shown as passed through the table or support C, and as having a deep-slotted head, said slot extending to the line 16′. Pivoted within this slot, upon a pin or stud 17, is a swinging pintle 18 having a beveled stop-face 18′, which, when the operative parts of the needle mechanism are in their normal positions with respect to the main-frame B and the table C, crosses the slot in said bolt in diagonal direction. When the bed-plate C and the arm E are tilted, however, to the position shown in dotted lines, Fig. 1, the beveled face of said pintle lies in a horizontal plane engaging the lower stop-face or wall of the slot in the head of the bolt. The angle of said bevel is such that the pintle swings, preferably in an arc of about fifty degrees from the horizontal. The lower hinged portion of the pintle is rectangular in form, to conform to the outline of the slot in the head of the bolt, and to prevent lateral swinging thereof with respect to said bolt. The upper portion is preferably rounded, as shown, and is engaged in a correspondingly shaped recess or slot in the side or rear edge of the bed-plate D. It will be understood, of course, that two or more of such connections between the main-frame and the said bed-plate are provided; and it will be seen that the upper portion of the machine, carrying the operating parts, can be readily tilted back upon said pintles or removed from engagement therewith, if desired. The bolts 16 are maintained in fixed positions, relatively to the frame, by means of the adjusting and locking-nuts 19 and washers 20.

With the belt in the position shown in full lines in Fig. 1, it will be evident that, when the bed-plate and its mechanism are tilted to the rear, said belt will be oscillated about the two points 21 and 22, and will be carried to the position shown in dotted lines. The slack of the belt will be so slight that said belt will not be thrown off of either of the main wheels or the guide-wheel, but will maintain the same relative position with regard to the driving-wheel and the driven-wheel as when in its normal position. The rear edge of the opening formed in the table C, for the passage of the belt, will serve as a stop to prevent the slacking of the draft-run of said belt. If desired, a friction-roller may be mounted on the frame at the point 21.

While the driving connection G, is herein shown as a belt of the usual construction, I do not limit myself to the use of a belt, as the said connection may be any desired form of driving band. I include with the term "driving band," any of the well-known means for connecting a driving and a driven shaft or wheel, such as a rope, a belt, or a metallic-sprocket-chain.

It will be evident from the foregoing that all the operating parts of the driven-machine may be quickly brought into a position where they may be inspected, and any necessary adjustments readily effected, without removing any portion of said machine from the framework, and this without throwing the belt off from the driving-wheel or in anywise affecting the relative adjustments of the transmission gearing or operative parts of the driven-machine or needle-mechanism. The organization of devices herein shown and described thus forms a very simple and effective means for inspecting the different parts of the machine, for adjusting the operating devices, and for preventing the disengagement of the driving band from the driving and driven wheels by providing slack take-ups therefor, one of which is formed by the friction-roller or guide 13, and the other by the rear-wall of the belt-opening in the frame.

Having thus described my invention, I claim—

1. In a mechanism of the character described, the combination with the main frame, of an auxiliary frame pivotally carried thereon and having a determined arc of movement, a ro-

tary driving-member of relatively large diameter and journaled upon the main frame remote from said pivot, a rotary driven-member of relatively small diameter and journaled upon the auxiliary frame remote from said pivot, a driving-band between and connecting said rotary members, a guide upon the main frame and contiguous to the outer side of the rearward run of the driving-band and adjacent to and in the rear of the pivotal axis of the auxiliary frame and in position and adapted to permit the outward swinging of the upper portion of said run of the driving band relatively to the lower portion of said run, and a guide-wheel carried by the main frame and located contiguous to the outer side of the forward run of the driving-band and adjacent to and in advance of the pivotal axis of the auxiliary frame and having its band-engaging face in all positions of the auxiliary frame in the rear of the corresponding common tangent to the forward band-engaging faces of the aforesaid rotary members, whereby the upper and lower portions of the forward run of said driving-band are constantly carried by said guide-wheel at an angle to each other and in the rear of such common tangent and the driving-band is thereby positively controlled in all positions of the auxiliary frame, substantially as set forth.

2. In a mechanism of the character described, the combination with the main frame, of an auxiliary frame pivotally carried thereon and having a determined arc of movement, a rotary driving-member of relatively large diameter and journaled upon the main frame remote from said pivot, a rotary driven-member of relatively small diameter and journaled upon the auxiliary frame remote from said pivot, a driving band between and connecting said rotary members, and a pair of guides carried by the main frame and contiguous respectively to the outer sides of the forward and rearward runs of the driving-band and each adapted to maintain a point in its respective run in substantially fixed relation to the pivotal axis of the auxiliary frame and adjacent to said axis at opposite sides thereof and each also adapted to permit the outward swinging of the upper portion of its respective run relatively to the lower portion of such corresponding run, substantially as set forth.

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