July 20, 1926. 1,593,250

P. L. ECHANDIA

DRIVING CONNECTION FOR SEWING MACHINES

Filed Dec. 22, 1921 2 Sheets-Sheet 1

Fig. 1.

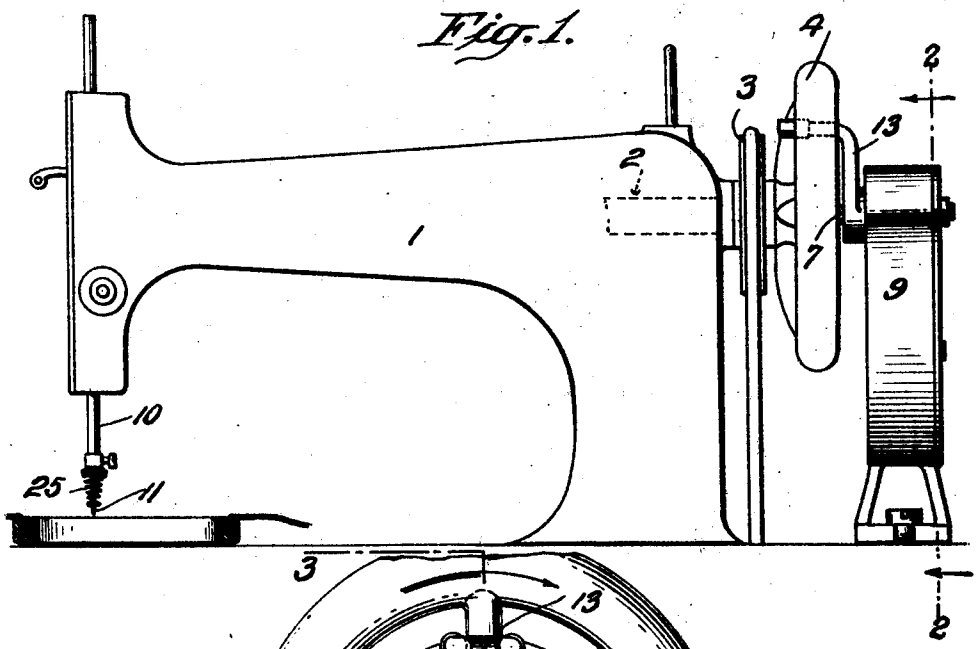
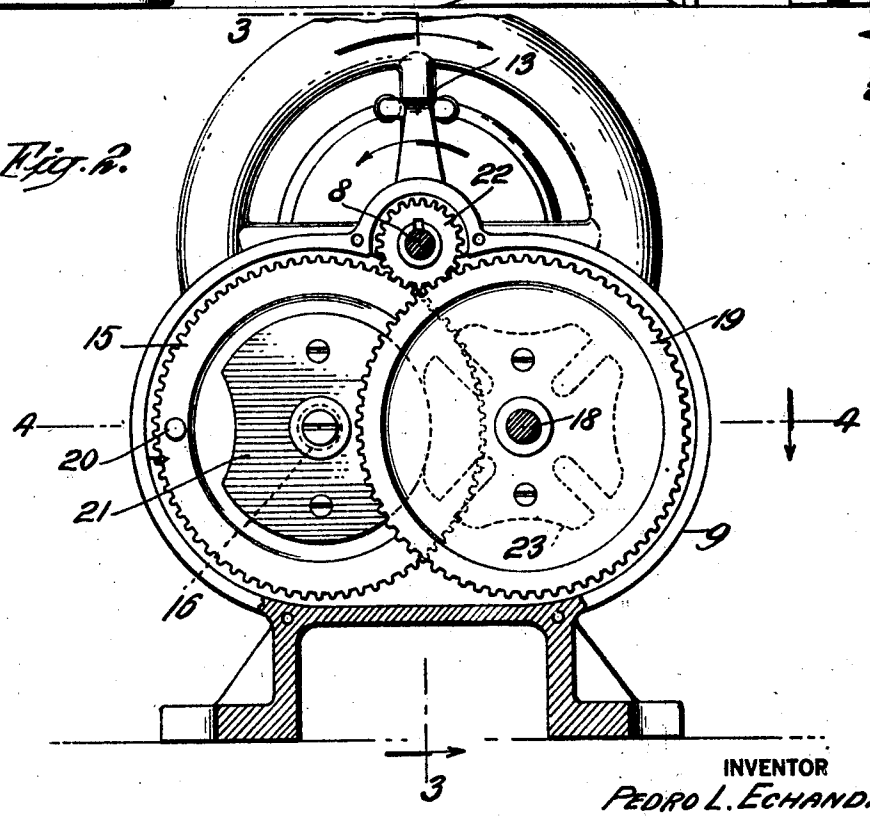


Fig. 2.



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Fig. 7.

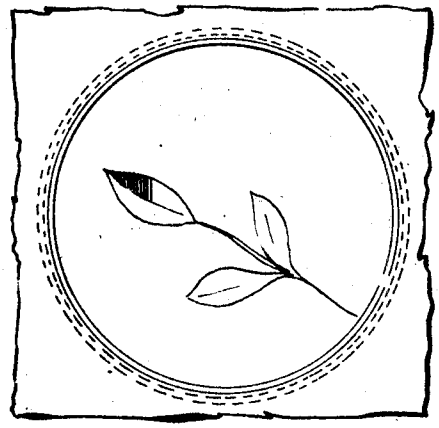


Fig. 3.

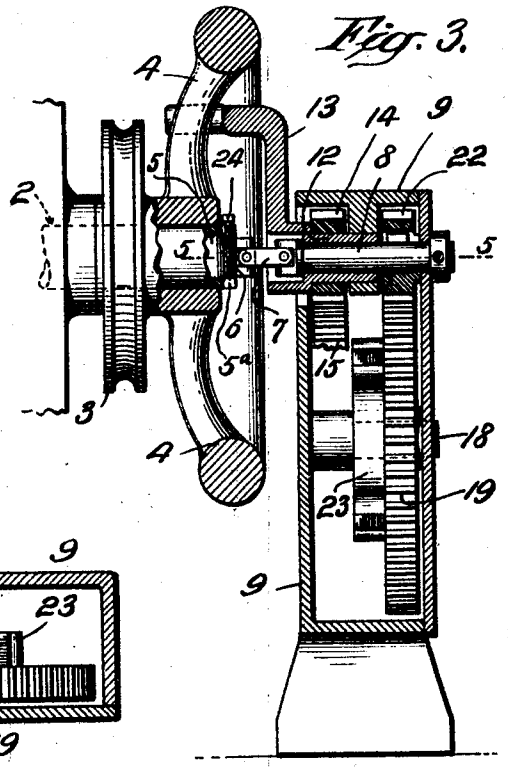


Fig. 4.

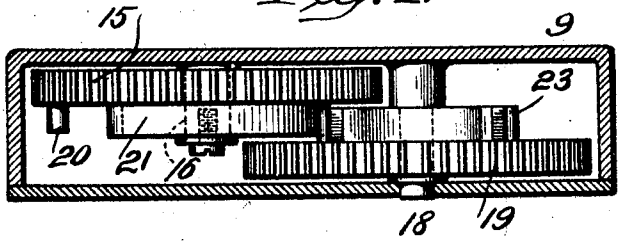


Fig. 5.

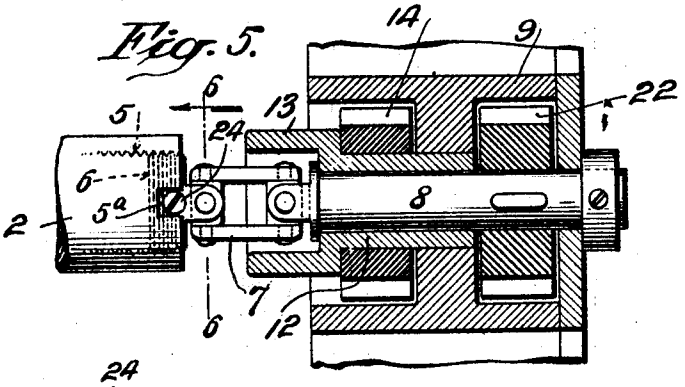
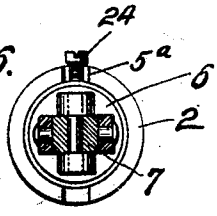


Fig. 6.



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UNITED STATES PATENT OFFICE.

PEDRO L. ECHANDIA, OF NEW YORK, N. Y.

DRIVING CONNECTION FOR SEWING MACHINES.

Application filed December 22, 1921. Serial No. 524,076.

This invention relates to improvements in driving connections for sewing machines.

One of the objects of this invention is to produce a driving connection for sewing machines in the form of an attachment which will enable embroidery stitching to be done on the conventional sewing machine.

Another object of this invention is to produce an attachment which will cause the driving shaft of a sewing machine to be rotated intermittently so as to cause a sufficient "dwell" or time interval in the reciprocatory movement of the needle to permit the taking of stitches of varying lengths required in making embroidered designs.

Another object of this invention is to provide a simple device or mechanism which is operated by the power pulleys of the machine without modifying or changing the location thereof and which may be readily and quickly attached and detached therefrom.

Another object of my invention is to provide a device of the character specified which will occupy a minimum of space and will be located in the plane of the machine casting.

With these and other objects in view, the invention comprises the combination of members and arrangement of parts so combined as to co-act and cooperate with each other in the performance of the functions and the accomplishment of the results herein contemplated, and comprises in one of its adaptations the species or preferred form illustrated in the accompanying drawings, in which:—

Fig. 1 is a side elevation of a sewing machine to which my attachment has been applied;

Fig. 2 is a section on the line 2—2 of Fig. 1 looking in the direction of the arrow;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a section on the line 4—4 of Fig. 2;

Fig. 5 is an enlarged detail in section on the line 5—5 of Fig. 3 of the hub and spindle of the attachment;

Fig. 6 is a section on the line 6—6 of Fig. 5; and

Fig. 7 is a plan view of an embroidery frame showing a design capable of being made by the use of my invention.

Referring now to these drawings, 1 indicates the frame or casing of a sewing machine having the usual horizontal drive shaft 2 on which is mounted a belt pulley 3 and hand wheel 4, which are usually formed integrally and coupled to the outer end of the shaft 2 by a suitable key or clutch, not shown. In the conventional sewing machine, the drive-shaft 2 is provided with a screw-threaded clutch socket 5, having a transverse keying slot 5^a and a clutch is seated in said socket to connect the shaft and drive members comprising the belt pulley 3 and hand wheel 4 together.

In carrying out my invention, this clutch, which as aforesaid connects the shaft 2 to the drive members, is removed so as to permit the belt pulley 3 and hand wheel 4 to rotate freely on said shaft 2, and I utilize this socket for connecting my attachment to the drive shaft 2. This connection is accomplished by means of a screw-threaded plug 6 which is connected at its opposite end to a spindle 8 by means of what I shall term a flexible coupling 7. Said coupling is so flexible as to enable the making of a connection even though the shaft 2 and spindle 8 are somewhat out of alignment, and as shown said flexible coupling has a universal joint between the plug and spindle.

The spindle 8 is, as illustrated, mounted at the top of a casing 9 which, when the attachment is in use, is arranged contiguous to the end of the machine frame and substantially in the same plane thereof so that said spindle 8 will be substantially in axial alignment with the shaft 2. Said spindle 8 will through its coupling 7 transmit any rotary motion given thereto to the shaft 2 and, as shown, I provide for the rotating of said spindle intermittently by the power devices of the sewing machine. This intermittent movement will in turn cause a "dwell" or time interval in the up and down reciprocation of the needle arm 10 and needle 11 and will enable an operator to make stitches of varying lengths required in embroidery. The power devices 3 and 4 of the machine, comprising the belt pulley 3 and hand wheel 4, rotate co-axially with the drive shaft 2 and in order to procure the continuous rotary motion of the power devices and to convert such continuous motion into intermittent motion, and then to transmit

this intermittent motion directly to the drive shaft, I utilize two co-axial members in my attachment.

Thus, the spindle 8 is arranged to rotate coaxially with a sleeve member 12 which is continuously rotated by a crank 13 having an operative connection with the power members of the machine, and a train of gearing for converting such continuous motion into intermittent motion is interposed between said sleeve 12 and the spindle 8.

In the embodiment shown, the sleeve 12 rotates loosely on the spindle 8 and has fixed thereto a pinion 14 and the spindle 8 has fixed thereto at one side of said pinion 14 a pinion 22, and I interpose between the pinions 14 and 22 a train of gearing preferably embodying a Geneva wheel. As illustrated, the pinion 14 meshes with a large gear 15 mounted on a horizontal shaft 16, and the pinion 22 meshes with a gear 19 fixed on a shaft 18 mounted in the said housing in substantially horizontal alignment with the shaft 16. One of such gears 15 and 19 carries a star wheel and the other carries an operating projection and a locking disc for such star wheel. As illustrated, the gear 15 is provided with the operating projection 20 and locking disc 21 and the gear 19 is provided with the star wheel 23.

In operation the motion of the power members of the sewing machine is preferably reversed in order to give the crank reverse continuous motion. The fork of the crank is connected to a spoke of the hand wheel and the drive shaft of the machine and spindle are connected together by first unloosening the screw-threaded plug 6 from the attachment, inserting it in the clutch socket of the shaft 2 with a set screw 24 in the slot 5^a to lock the same in place and the plug is then connected to the universal joint member of the attachment coupling. This will effectively couple the drive shaft to the spindle and the power devices with the sleeve. On rotation of the sleeve by the power devices, the pinion 14 will continuously rotate the gear 15 having the operating projection which on every turn will mesh with the star wheel 23 on the gear 19, which will thus be caused to rotate intermittently and this intermittent rotation will, by the meshing of the gear 19 with the pinion 22, cause the spindle 8 to be rotated intermittently and this intermittent rotation will be transmitted by such spindle to the drive shaft of the machine which in turn will cause a dwell after each reciprocation of the needle arm and needle, so as to enable an operator to make the varying lengths of stitches required in embroidery.

In embroidering the presser foot of the machine is preferably removed and a spring presser 25 substituted therefor.

Having described my invention, I claim:—

1. The combination with a sewing machine having a main shaft and driving means mounted thereon, of a driving connection for operating said shaft from said driving means, said connection comprising a frame, a spindle mounted in said frame, positively engaging means for coupling said spindle to the main shaft of the sewing machine and means connected with the power devices of the machine for causing said spindle to turn intermittently and to transmit such intermittent movement through the coupling means to the main shaft of the machine.

2. The combination with a sewing machine having a main shaft and driving means mounted thereon, of a driving connection for operating said shaft from said driving means, said connection comprising a frame, a spindle mounted in said frame in substantial alignment with the main shaft of a sewing machine, a positively-engaging flexible coupling between said spindle and main shaft and means connected with the power devices of the machine for causing said spindle to turn intermittently and to transmit such intermittent movement through the coupling means to the main shaft of the machine.

3. The combination with a sewing machine having a main shaft and driving means mounted thereon, of a driving connection for operating said shaft from said driving means, said connection comprising a frame, two members rotating co-axially within said frame, positively-engaging means for connecting one of such members to the main shaft of the machine, means for connecting the other member to power devices of the machine so as to give the same continuous rotary movement and means connecting said two members for changing said continuous rotary movement of one member into intermittent movement of the other member.

4. The combination with a sewing machine having a main shaft and driving means mounted thereon, of a driving connection for operating said shaft from said driving means, said connection comprising a frame, a spindle mounted in said frame in substantially horizontal alignment with the main shaft of the sewing machine, positively-engaging means for connecting said spindle and main shaft, another member rotating co-axially with said spindle, means adapted to be connected with the power devices of the machine for continuously rotating said second member and means for changing the continuous movement of said co-axial member into intermittent movement of said spindle.

5. The combination with a sewing machine having a main shaft and driving

means mounted thereon, of a driving connection for operating said shaft from said driving means, said connection comprising a frame, a spindle mounted in said frame in substantially horizontal alignment with the main shaft of the sewing machine, positively-engaging means for connecting said spindle and main shaft, another member rotating co-axially with said spindle, means adapted to be connected with the power devices of the machine for continuously rotating said second member, means for changing the continuous movement of said co-axial member into intermittent movement in said spindle comprising a train of gears mounted in said frame.

6. The combination with a sewing machine having a main shaft and driving means mounted thereon, of a driving connection for operating said shaft from said driving means, said connection comprising a frame, two members rotating co-axially within said frame, a positively-engaging flexible coupling for connecting one of such members to the main shaft of the machine, a crank for connecting the other to the power devices of the machine so as to give the same continuous rotary movement and means connecting said two members for changing said continuous rotary movement of one member into intermittent movement of the other member.

7. The combination with a sewing machine having a main shaft and driving means mounted thereon, of a driving connection for operating said shaft from said driving means, said connection comprising a frame, two members rotating co-axially within said frame, a positively-engaging flexible coupling comprising a universal joint and a threaded plug at its outer end for connecting one of such members to the main shaft of the machine, a crank for connecting the other to the power devices of the machine, so as to give the same continuous rotary movement and means connecting said two members for changing said continuous rotary movement of one member into intermittent movement of the other member.

8. The combination with a sewing machine having a main shaft and driving means mounted thereon, of a driving connection for operating said shaft from said driving means, said connection comprising a casing, a spindle member mounted at the upper end of said casing, a sleeve member mounted on said spindle to rotate co-axially therewith, means for connecting one of said members to the power devices of the machine to impart continuous rotary movement thereto, means for positively connecting the other member to the main shaft of the sewing machine and means for translating the rotary movement of said first mentioned member into intermittent movement of the other member.

9. The combination with a sewing machine having a main shaft and driving means mounted thereon, of a driving connection for operating said shaft from said driving means, said connection comprising a casing, a spindle member mounted at the upper end of said casing, a sleeve member mounted on said spindle to rotate co-axially therewith, a crank for connecting said sleeve to the power devices of the sewing machine to impart continuous rotary movement thereto and a train of gears mounted in said casing for translating the rotary movement of said sleeve into an intermittent movement in said spindle member and a positively-engaged flexible connection between said spindle member and the main shaft of the machine.

10. The combination with a sewing machine having a main shaft and driving means mounted thereon, of a driving connection for operating said shaft from said driving means, said connection comprising a casing, a spindle member mounted at the upper end of said casing, a sleeve member mounted on said spindle to rotate co-axially therewith, a crank for connecting said sleeve to the power devices of the sewing machine to impart continuous rotary movement thereto, a Geneva gear interposed between said spindle member and sleeve member to convert the rotary movement of the sleeve to an intermittent movement of the spindle and means for coupling said spindle to the main shaft of the machine.

11. The combination with a sewing machine having a main shaft and driving means mounted thereon, of a driving connection for operating said shaft from said driving means, said connection comprising a casing, a spindle member mounted at the upper end of said casing, a sleeve member mounted on said spindle to rotate co-axially therewith, a crank for connecting said sleeve to the power devices of the sewing machine to impart continuous rotary movement thereto, a train of gears interposed between said spindle member and said sleeve comprising a pinion on said sleeve, another pinion on said spindle and a pair of gear wheels independently meshing with said pinions, one of which carries a star wheel and the other an operating projection and locking means for such star wheel whereby the continuous rotation of the sleeve is converted into intermittent motion of the spindle and means for connecting said spindle to the main shaft of the machine.

12. The combination with a sewing machine having a main shaft and driving means mounted thereon, of a driving connection for operating said shaft from said driving means, said connections comprising

a casing, a spindle member mounted at the upper end of said casing, a sleeve member mounted on said spindle to rotate co-axially therewith, a crank for connecting said sleeve to the power devices of the sewing machine to impart continuous rotary movement thereto, a train of gears interposed between said spindle member and said sleeve comprising a pinion fast on said spindle; another pinion fast on said sleeve; a gear mounted within said casing and meshing with said pinion on the spindle; a star wheel carried by said gear; another gear mounted in said casing having a meshing engagement with the pinion on said sleeve and carrying a locking disc and operating projection for engaging the said star wheel, and a flexible connection for connecting said spindle to the main shaft of the machine.

In witness whereof, I have signed my name to the foregoing specification.

PEDRO L. ECHANDIA.