June 18, 1940. G SAUER 2,205,176

POWER TRANSMITTER

Filed June 5, 1937 3 Sheets-Sheet 1

FIG. I.

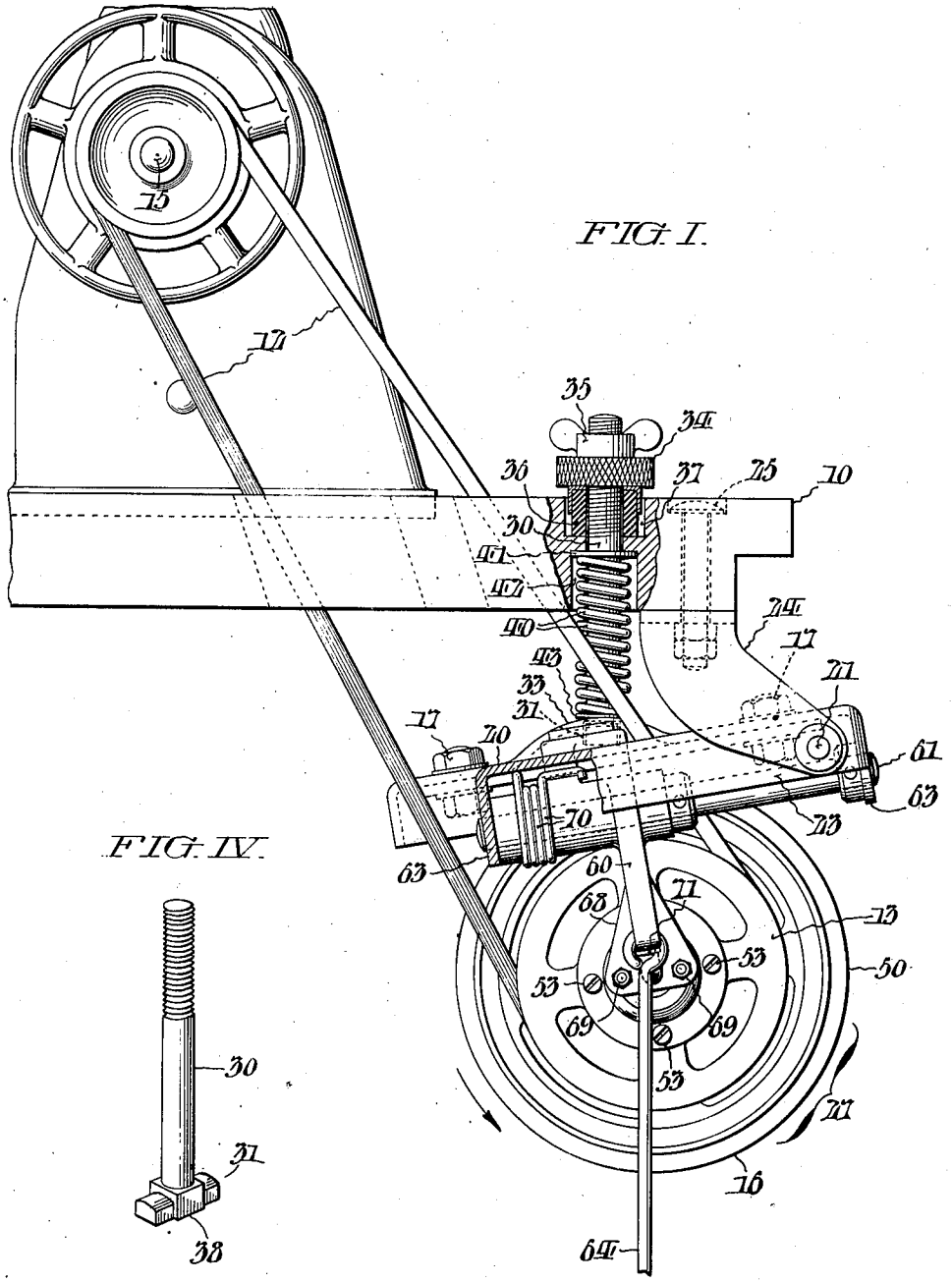


FIG. IV.




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FIG. II.

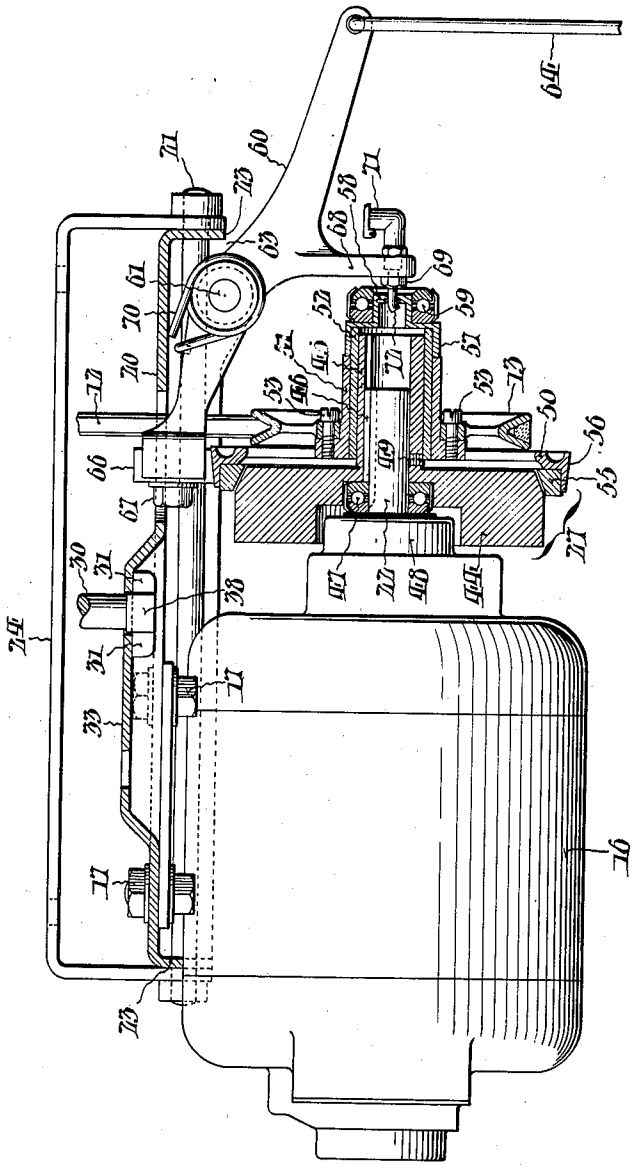

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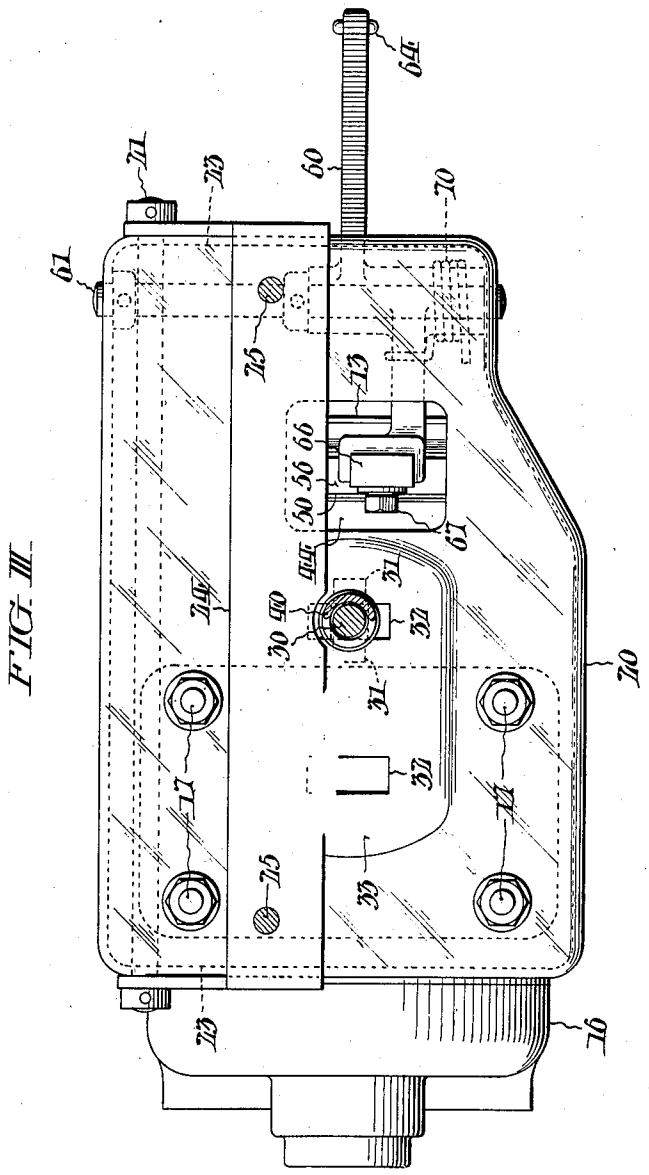
FIG. III

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# UNITED STATES PATENT OFFICE

2,205,176

## POWER TRANSMITTER

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Application June 5, 1937, Serial No. 146,551

6 Claims. (Cl. 74—242.13)

My invention relates to driving units and power transmitters, and is adaptable and advantageous for motor driven machines such as sewing machines, and especially where the motor drives through a belt. I aim to provide for maintaining the belt properly taut, and for its easy and convenient adjustment to tighten or loosen the driving connection, utilizing the motor itself for the purpose. In using a clutch between the motor and the parts or machinery driven by it, I may dispense with the use of any spring in the clutch itself, for the purpose of throwing it out, accomplishing this through the braking means employed to stop the driven parts. Various other features and advantages of the invention will appear from the following description of a species or form of embodiment, and from the drawings.

In the drawings,

Fig. I is an end view of the power transmitter applied to a sewing machine, certain parts being partly broken away or in section.

Fig. II is a side view of the transmitter, with certain parts in vertical longitudinal mid-section, the section being taken somewhat irregularly in order to show various parts more clearly.

Fig. III is a plan view of the transmitter.

Fig. IV is a tilted or perspective view of a bolt.

In Fig. I, the transmitter is shown mounted beneath a sewing machine table 10 and drives the sewing machine 11 through a belt 12 (here shown as of V-section) that extends around suitably grooved pulleys 13 and 14, the pulley 13 being associated with or forming part of the transmitter, and the pulley 14 being mounted on the main drive shaft 15 of the sewing machine. As shown in Figs. I, II and III, the transmitter comprises an (electric) motor 16 which is attached, as by bolts 17, to a support or base plate 20 mounted for movement down or up relative to the fixed support or table 10, to tighten or loosen the belt 12. For this purpose, the supporting plate or motor mounting 20 may be pivoted or fulcrumed on a pivot pin or bolt 21 extending, substantially parallel with the motor shaft 22, through downturned marginal flanges 23 at opposite ends of the supporting plate, and through rearward-projecting ears of a support bracket 24, which may be secured to the underside of the table 10 at or adjacent its rear edge by bolts 25. As shown in Fig. I, the relation of the pixot axis 21 of the support 20 to the belt 12 and the motor 16 is such that the weight of the motor acts to tighten the belt. Besides the rotary driving member or pulley 13 and the motor 16, the power unit of the transmitter includes an interposed (friction) clutch 27,—all these parts being preferably coaxial with the motor shaft 22. The clutch 27 serves as a means of controlling the operation of the pulley 13 and the parts driven therefrom, and may be aided in this by a braking mechanism for stopping the driven parts when the clutch is thrown out, as described hereinafter.

Belt-tightening downward movement of the motor 16 may be limited by any suitable means, such as a bolt 30 whose T-head 31 is engaged in a transverse slot 32 in a longitudinal cylindrical upward embossment 33 of the base plate 20, and whose screw-threaded shank extends up through a hole in the table 10 and has adjusting means, shown as consisting of nut(s) 34, 35, which are conveniently accessible above the table for manipulation by an operator seated in front of the table. As shown in Fig. I, the nut 34 is a knurled adjusting nut, while the nut 35 is a wing lock nut. Between the nuts 34, 35 and the table 10 may be interposed a vibration-absorbing metal capped rubber washer 36, shown as seated in a recessed seat 37 in the top of the table. As best shown in Figs. II and IV, the head 31 of the bolt 30 includes a squared portion 38 which engages in the slot 32 in the base plate 20, to prevent the bolt from turning. To urge the power unit, including motor 16 and support 20, downward and keep the belt 12 taut,—even regardless of the motor weight,—a helical compression spring 40 may be mounted around the bolt 30, to act between a washer 41 in a recess 42 in the lower surface of the table 10 and a washer 43 engaging the top wall of the rounded portion 33 of the supporting plate 20. As shown in Figs. I, II and III, this portion 33 is provided with an extra bolt slot 32, for use in cases where a different location of the bolt 30 is desirable.

With the sewing machine shaft 15 and the motor 16 rotating counter-clockwise,—as usual, and as shown by the arrow in Fig. I,—the torque-reaction of the motor about pivot 21 opposes the downward belt-tightening tendency of the motor weight and of the spring 40; but the spring is made strong enough to overcome this and assure an adequate dominant belt-tightening force under all conditions. This allows of locating the motor 16 and its pivot 21 (as shown) well to the rear of the table board 10 on which the sewing machine 11 is mounted, so as to give room for that portion of the machine bed (not shown) which usually extends through the table board, as well as for the knees of the sewing machine operator seated in front of the table.

As shown in Fig. II, the clutch 27 includes a driving fly-wheel member 44 whose cylindrical hub 45 is mounted on the motor shaft 22 and is compelled to turn therewith by a key and keyway engagement indicated at 46. A ball bearing 47 may be interposed between the fly-wheel 44 and the motor casing 48, to take the end thrust of the clutch 27, so that it shall not be transmitted to the motor shaft 22 and the rotating parts of the motor itself (not shown). The fly-wheel 44 may be fixed to the shaft 22 by a set-screw 49 in its hub 45. With the driving clutch member 44 coacts a driven clutch member 50 whose cylindrical hub 51 is rotatably mounted on the fly-wheel hub 45. The hub 51 may be provided with a separate bushing or liner 52 of suitable bearing material. The pulley 13 is mounted around the hub 51 and secured to the member 50 by screws 53. The driven clutch member 50 may have a conical-surfaced friction liner 55 for engaging a corresponding conical surface on the driving clutch member 44, and may have a conically beveled (outer) braking surface 56, for coaction with other parts of a braking mechanism for controlling and stopping rotation of the parts driven through the clutch,—as described hereinafter. As shown in Fig. II, the hub 51 includes an end-cap 57 which is pressed on the end of the bearing bushing 52 and has a reduced end portion 58, around which is mounted an anti-friction ball bearing 59.

For operating the clutch 27 and the brake mechanism just referred to, a rocking lever 60 is fulcrumed on the support 20, about an axis formed by a pivot pin or bolt 61 extending substantially at right angles to the pivot bolt 21, and mounted in apertures in ears 63 at opposite sides of the base plate 20. As shown, the actuator lever 60 is fulcrumed between the spaced apart ears or bracket arms 63 of the motor support 20. These ears 63 may be formed by downward extension of the marginal flanges 23 of the plate 20. One arm of the lever 60 is apertured for a flexible and universal pivotal engagement or connection with the eye of an operating link rod 64, while its other arm carries a brake block 66 whose acting face is beveled in correspondence with the conical bevel of the periphery 56 of the driven clutch member 50, with which it coacts. The brake block 66 is seated in a vertical channel in the enlarged end of the lever 60, and secured by a bolt 67. The lever 60 also has a downward projecting arm 68 which carries round headed abutment bolts 69 for engaging the ball bearing 59 at either side of the axis of the motor shaft 22,—or of the reduced cap portion 58 on which the ball bearing is mounted. As shown in Figs. I, II, and III, a helical torsion spring 70 is mounted around the bearing hub of the lever 60, with one end engaging the supporting plate 25 and the other engaging the lever: this spring 70 acts to urge the brake block 66 against the periphery 56 of the driven clutch member 50, and preferably has sufficient braking force to stop the driven parts quickly. As shown in Fig. II, a lubricator 71 is mounted on the arm 68 of lever 60 between the round headed bearing bolts 69, with its delivery tube 72 extending into the interior of the cap portion 58 to deliver oil for lubricating the bearing surfaces of parts on the motor shaft 22.

When it is desired to drive the sewing machine 11, the operator operates a foot treadle (not shown), or other means connected to the rod 64, so as to lift the brake shoe 66 from the driven clutch member 50 and at the same time push the latter to the left into engagement with the driving clutch member 44. When it is desired to stop the machine, the operator has only to release the treadle or other actuator for the rod 64, when the spring 70 will automatically throw in the brake 66 against the conically beveled periphery of the driven clutch member 50, thereby pushing the member 50 to the right to throw out the clutch 27, and also stop the driven parts. When it is desired to adjust the support 20 and the motor 16 relative to the machine-supporting structure 10 to tighten or loosen the belt 12,—to take care of a difference or change of length, or to facilitate the removal or installation of a belt,—the operator has only to loosen the wing nut 35 and then lower or raise the support 20 by a knurled adjusting nut 34, afterward re-tightening the wing nut 35 to relock the nut 34. The universally flexible eye-connection of the link-rod 64 to the lever 60 allows the link-rod to operate effectively in all angular positions of the support 20 about its pivot 21, within the normal range of angular relations between the parts 20 and 10 that is permitted by the bolt 30, or by the belt 12.

Having thus described my invention, I claim:

1. A driving unit for sewing machines and the like comprising a motor and a rotary driving member, with interposed clutch means; means for mounting said motor on the supporting structure of the machine to be driven, for movement relative thereto to tighten or loosen the driving connection between said driving member and said machine; means for adjusting said mounting means and said motor relative to said supporting structure; an actuator for said clutch means mounted on the aforesaid mounting means, and thus moving with said mounting means and said motor relative to said supporting structure; and an operating connection for said actuator flexibly pivoted thereto to operate the same in all normal angular relations of said motor to said structure.

2. A driving unit for sewing machines and the like comprising a motor and a driving member, with interposed clutch means; means for mounting said motor on the supporting structure of the machine to be driven, for movement relative to tighten or loosen the driving connection between said driving member and said machine, comprising a motor support with spaced apart arms; means for adjusting said support and motor relative to said supporting structure; an actuating lever for said clutch fulcrumed between said bracket arms about an axis substantially perpendicular to the motor shaft and thus moving with said mounting means and said motor relative to said supporting structure; and an operating connection for said lever universally pivoted thereto to operate the same in all normal angular relations of said motor to said structure.

3. The combination with a pulley and shaft to be driven, and a fixed support therefor; of a motor with mounting pivoted to said support eccentrically to its shaft, and a pulley to be driven by said motor shaft, with means for controlling its operation; a driving belt connecting the latter pulley to that on the aforesaid shaft to be driven, arranged to be tightened by swinging of the motor about its pivot on said fixed support; an operating lever for said controlling means pivoted to the motor mounting; and an operating connection for said lever universally pivoted thereto, so as to be operable in all normal angular relations of said motor to said fixed support.

4. The combination with a pulley and shaft to

be driven, and a table support therefor provided with a pivot-fulcrum bracket; of a base plate with laterally projecting flanges at its opposite sides and ends; a fulcrum pivot extending substantially parallel with said pulley shaft through said pivot-fulcrum bracket and through the end flanges of said base plate; a motor on said base plate having its shaft parallel to said fulcrum pivot and said pulley shaft, with a pulley on the motor shaft and a friction clutch and brake for controlling its operation by the motor; a driving belt connecting the latter pulley to that on the aforesaid shaft to be driven, and arranged to be tightened by the motor weight; a spring acting between said support and said base plate, in aid of the belt-tightening action of the motor weight; an operating lever for said friction clutch and brake, and a fulcrum pivot therefor mounted in the side flanges of said base plate, substantially at right angles to the aforesaid shafts and fulcrum pivot; means for limiting the downward, belt-tightening movement of the motor connected to said base plate, and extending and adjustable above said table support; and an operating connection for said lever universally pivoted thereto-so as to be operable in all angular relations of said base plate to said table support, within the range permitted by the aforesaid adjustable limiting means.

5. The combination with a shaft to be driven having a pulley, of a power unit comprising a motor and a pulley with interposed clutch means for interconnecting and disconnecting them, brake mechanism controlling rotation of the parts driven through said clutch means, a belt interconnecting said pulleys, a pivotally mounted support for said power unit with its pivotal axis substantially parallel to the motor axis, and so related thereto that movement of said power unit about its said pivotal axis tightens the belt, an actuating lever for said clutch means and brake mechanism fulcrumed on said support, and an operating connection for said lever flexibly connected thereto so as to be effective notwithstanding angular movement of the support about its pivot.

6. In a motor transmitter, the combination of a power unit comprising a motor and a pulley with interposed clutch means for interconnecting and disconnecting them, a belt for connecting said pulley to parts to be driven by the motor, a support for said power unit comprising a plate with laterally bent apertured portions, a supporting pivot for said plate extending through opposite apertures of such portions substantially parallel with the motor axis, a pivot extending through opposite apertures of other such portions substantially at right angles to the first mentioned pivot, and means rockable on said last-mentioned pivot to control said clutch and the rotation of the parts driven through it.

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