July 24, 1923. 1,462,516

A. T. MACE

MOTOR DRIVE FOR SEWING MACHINES

Filed Feb. 27, 1919 4 Sheets-Sheet 1

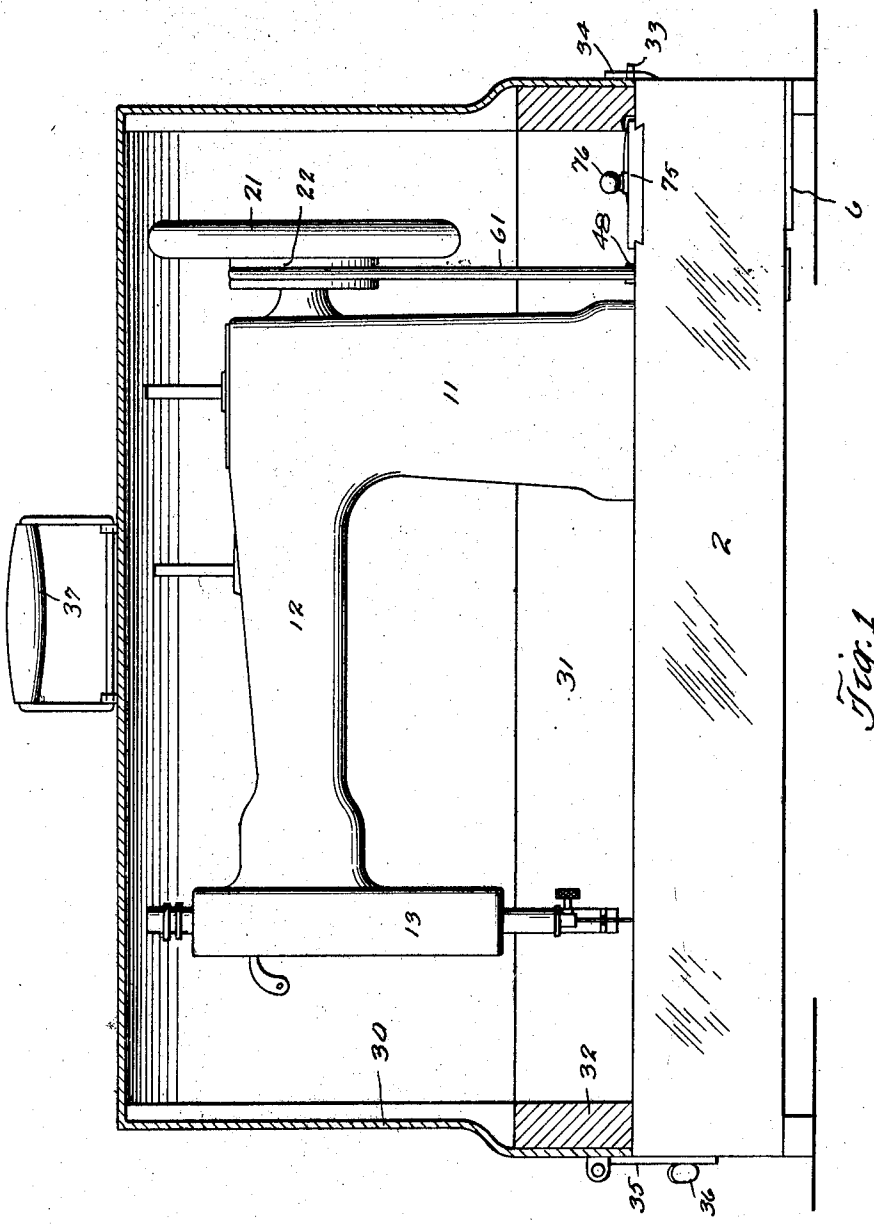


Fig. 1

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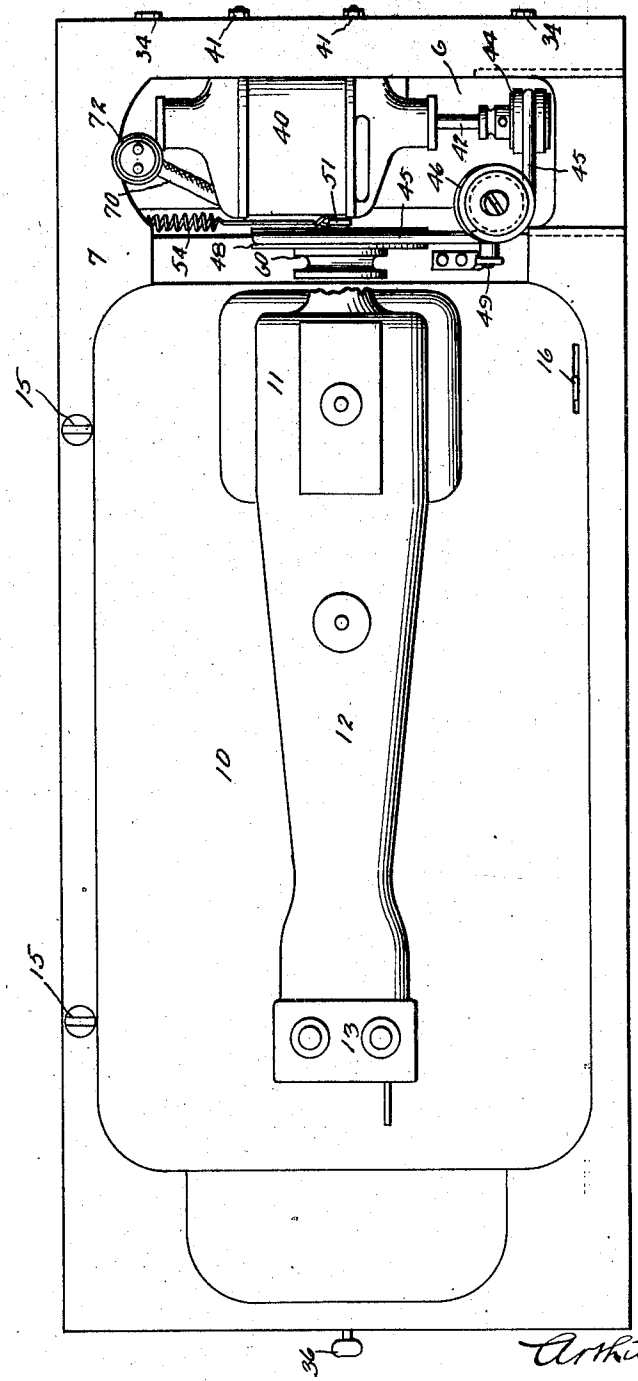


Fig. 2

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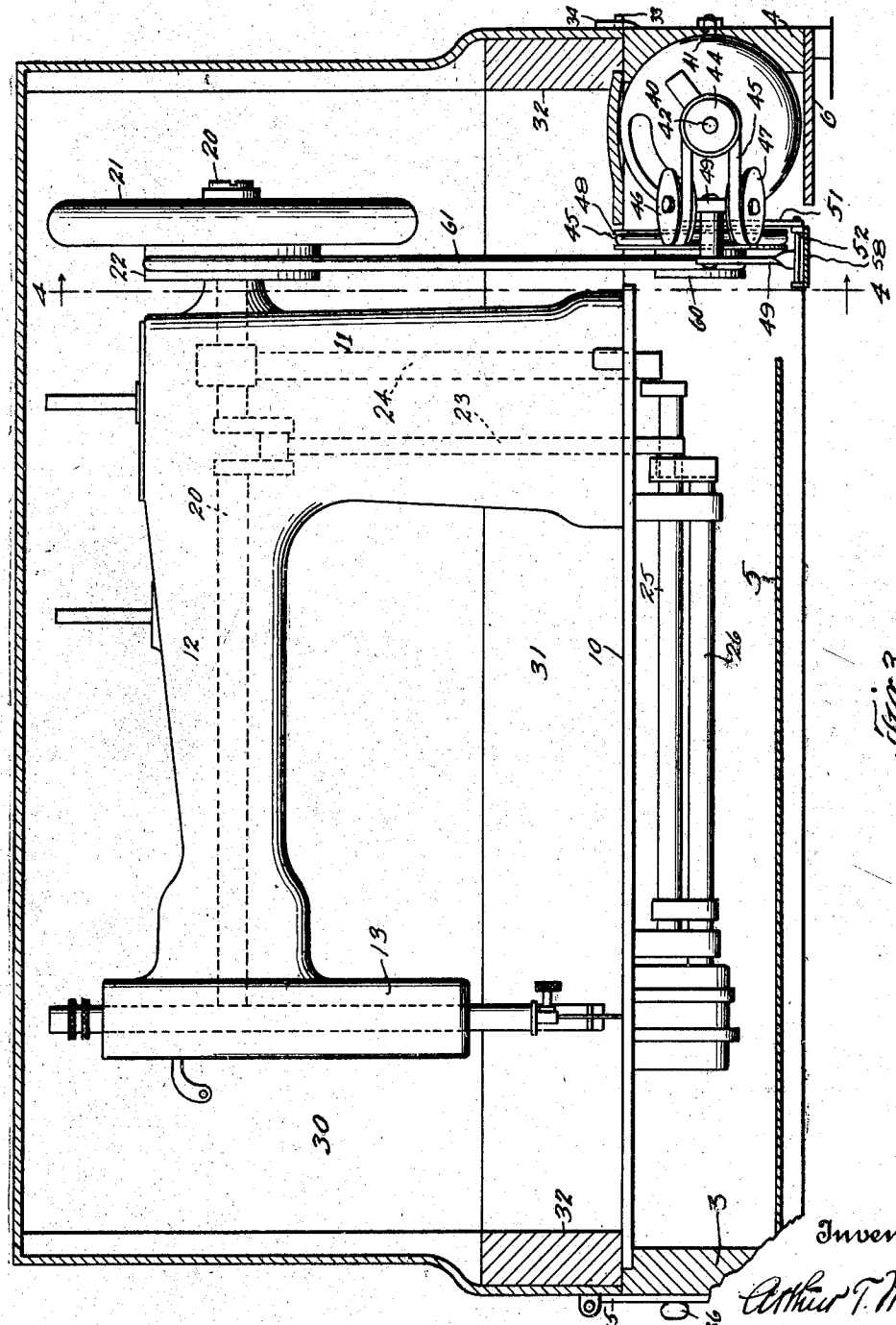


Fig. 3

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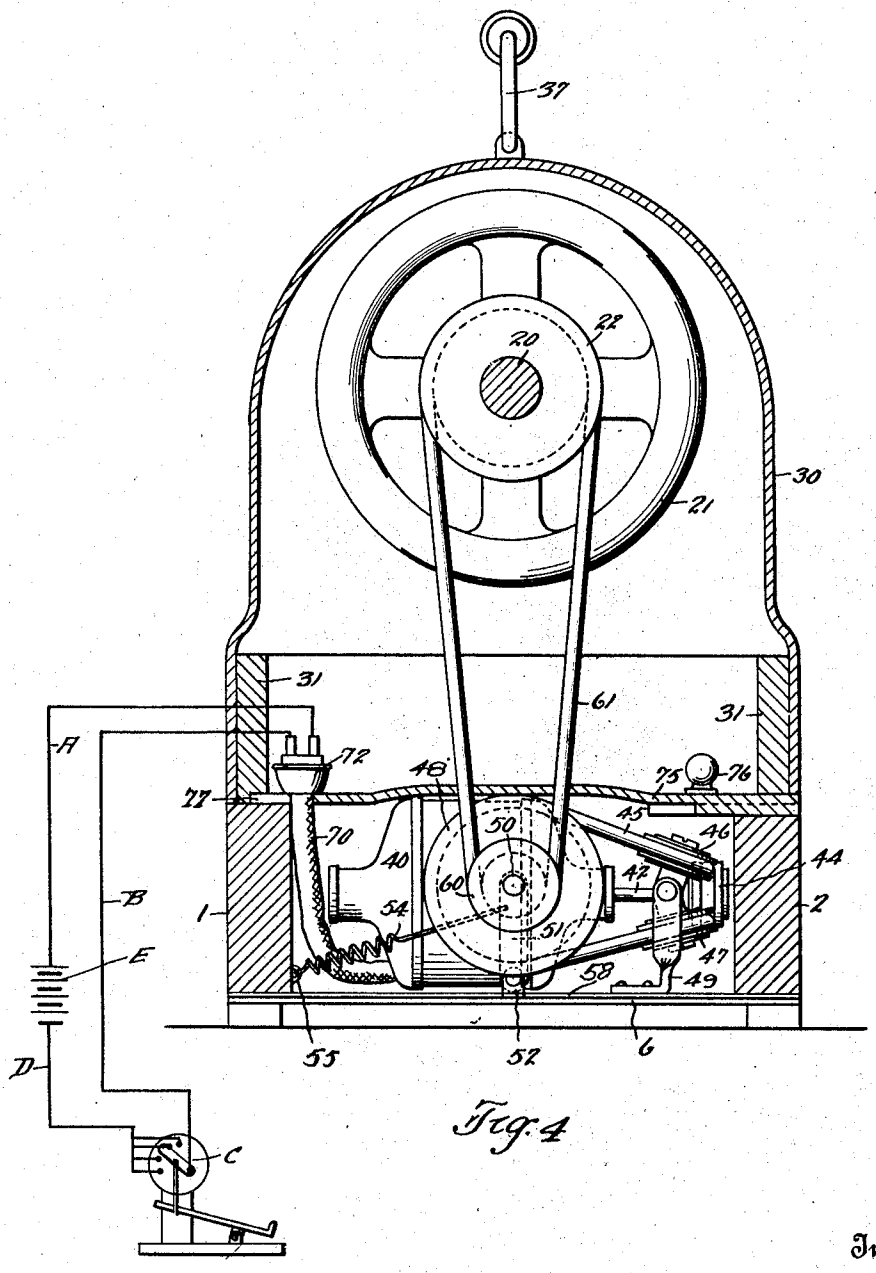


Fig. 4

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UNITED STATES PATENT OFFICE.

ARTHUR T. MACE, OF EAST CLEVELAND, OHIO, ASSIGNOR TO THE DOMESTIC ELECTRIC COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

MOTOR DRIVE FOR SEWING MACHINES.

Application filed February 27, 1919. Serial No. 279,474.

To all whom it may concern:

Be it known that I, ARTHUR T. MACE, a citizen of the United States, residing at East Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Motor Drives for Sewing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to motor driven sewing machines and the object is to provide a motor drive adapted to be mounted in the ordinary hollow base of a portable sewing machine, enabling the machine and its driving mechanism to be readily carried as a unit, and to be positioned wherever desired and operated and controlled by electric current.

Sewing machine heads intended for external motor driving are on the market, and are ordinarily mounted on a suitable hollow base to the top of which the base plate of the head is hinged, and into which project shafts and other parts of the sewing machine mechanism. A suitable cover is ordinarily removably secured to this hollow base. Such device may be carried by a handle secured to the cover, and when the cover is removed some external motor is suitably connected with the driving shaft of the sewing machine. Ordinarily, the motor is an entirely separate device located on its own support at the rear of the machine and suitably belted to a belt pulley on it.

My invention provides a motor housed within an existing space in the hollow base and operating the driving belt. My invention comprises broadly, a motor so located and operating, and also the more specific embodiment shown in the drawings, illustrating this invention. Such embodiment is hereinafter more fully described and the essential characteristics of the invention summarized in the claims.

In the drawings, Fig. 1 is a side elevation of a sewing machine head and base, and a cover therefor, shown in section. This base carries my motor mechanism, which is hidden from view; Fig. 2 is a plan of the structure shown in Fig. 1, with the cover of the sewing machine mechanism removed and with the slide cover of the motor mechanism removed; Fig. 3 is an elevation of the base and a portion of the cover and some of the operating parts of the sewing machine, this elevation being partly sectional; Fig. 4 is a transverse vertical section through the structure between the standard of the sewing machine head and the belt pulley as indicated by the line 4—4 on Fig. 3, looking toward the right.

The hollow base of the sewing machine shown comprises longitudinal strips 1 and 2, standing on edge, end members 3 and 4 and a partial top 7. Some suitable bottom is provided, as, for instance, the plates 5 and 6. The parts mentioned are ordinarily made of wood.

The sewing machine head shown comprises a metal base plate 10, a hollow standard 11, a hollow horizontal arm 12, extending from the standard, and a hollow head 13. The metal base 10 is ordinarily hinged at its rear to the wooden top 7 of the hollow base, as indicated by the hinges 15, in Fig. 2. At the front edge the base plate is secured by a suitable latch 16. Within the hollow arm is a main operating shaft 20 which carries a fly wheel 21 and a driving pulley 22. Within the hollow standard 11 is suitable mechanism, for instance, connecting rods 23 and 24, and below the plate 10 is a shuttle-operating mechanism, as the shafts 25 and 26 operated by the connecting rods. The particular construction of the sewing machine proper is independent of this invention. So far as the present invention is concerned the sewing machine may have any mechanism driven by the belt pulley 22.

The cover of the structure shown is a long arch-shaped hollow member 30 adapted to extend over the top of the machine and having at its base a rectangular bracing frame consisting of longitudinal members 31 and transverse members 32. At the right hand end this cover is shown as secured to the base by means of pins 33 carried by the cover projecting into a strip 34 carried by the base. At the other end the cover carries a suitable hinged hasp 35 which may extend over a pivoted button 36 adapted to lock it to the base. When locked a suitable handle 37 secured to the cover is adapted to carry the entire structure. When in place, the turning of the button 36 releases the hasp and then the cover may be tipped upwardly at that end and removed entirely.

In my invention the motor which drives

the machine is mounted in the hollow base, and I thus provide a sewing machine having a driving motor contained therein, the limits of the machine being the standard limits of the ordinary sewing machine proper, exclusive of the ordinary foot treadle operating mechanism. The motor driven construction will now be described.

40 indicates the frame of a motor which is mounted within the hollow base at the extreme right hand end thereof and has its axis extending transversely of the base. To economize space, the end member 4 of the base is concaved on its inner face and a portion of the motor frame occupies such concavity. The motor frame is secured by suitable bolts 41 to this end member. 42 indicates the armature shaft of the motor which extends to the front of the motor frame. At its forward end this shaft carries a grooved belt pulley 44. A belt 45 extends over this pulley and around a pair of guide pulleys 46 and 47 and thence over a vertical pulley 48. The pulleys 46 and 47 are mounted on diagonal studs carried by a bracket 49 which is shown as secured to a stationary cross bar 58.

The pulley 48 is mounted on a stud 50 projecting from the upper end of a link 51 pivoted at its lower end to a bracket 52 carried by the cross bar 58. A suitable spring 54 is connected to the link 51 and to an anchorage 55 carried by the board 1 and thus provides tension, keeping the belt 45 taut. Secured to the side of the pulley 48 is a smaller belt pulley 60. A belt 61 extends around this pulley and over the driving pulley 22 of the sewing machine.

The motor is fed by electric current through suitable feed wires which may be connected into a two-wire cable 70, to which the ordinary feeding and controlling wires may be attached. I have shown a suitable slide 75 forming a top for the motor cavity and having a dove-tailed engagement with the edge member 2 of the base frame. This slide in the embodiment shown is slightly arched to accommodate the motor frame, and is provided with a knob 76 by which it may be readily withdrawn. At its rear end it has a slot 77 through which the cable 70 extends, the cable being provided with one part of an ordinary separable electric connection 72 above this cover.

In the operation of my mechanism, an electric connection is made to the two internal points of the connection 72. One of these connections leads to one of the wires A from the source of supply, as indicated diagrammatically at E. The other electric wire connection leads by a wire B to a suitable foot controlled rheostat C. From this rheostat a wire D leads to the other terminal from the source of supply. When the current is turned on the motor is driven under the control of the rheostat C and the rotation of the armature is transmitted to the pulley 48 and its rotation is transmitted by the belt 61 to the sewing machine.

It will be seen that the operation is under the control of the operator, the same as if the motor were mounted in the ordinary manner at the rear of the machine and separate from the base. At the same time the motor mechanism is housed within an existing space in the portable base and does not require any extra room. The openings between the parts 5 and 6 of the base bottom and the opening in the base top through which the belt extends, sufficiently ventilate the base. The spring 54 maintains the belt 45 taut. If desired any suitable means may be provided to maintain the belt 61 taut but a belt tightener for this purpose is not ordinarily needed.

While the particular motor drive shown in the drawings is efficient and satisfactory and is included within the scope of my invention, it should be noted that I do not intend to limit myself thereto, as I believe I am entitled to any motor drive so constructed and arranged that it may be housed within the hollow base of a portable sewing machine mechanism. I am using the terms "portable" sewing machine and "hollow base" in contra-distinction to the platform machines supported by standards or those cabinets which constitute a comparatively fixed support for the sewing machine head and its mechanism.

Having thus described my invention, what I claim is:

1. In a portable sewing machine having an operating shaft, the combination of a sewing machine frame having a hollow base portion, a motor secured within the base portion and enclosed by an end extension thereof, power transmitting means extending from the hollow base portion to the operating shaft, and driving means connecting the motor and the power transmitting means including an intermediate speed reduction means interposed therebetween and completely enclosed by the base.

2. In a portable sewing machine having a main operating shaft and a pulley thereon, the combination of a sewing machine frame having a hollow base portion, a second pulley beneath the first pulley and enclosed by the base, a belt connecting the two pulleys, a motor positioned within the base portion and disposed within an extension thereof projecting beyond the operating shaft and intermediate speed reducing means completely enclosed by the base and drivingly interposed between the second named pulley and the motor shaft.

3. In a portable sewing machine, the combination of a sewing machine frame provided with a standard hollow base having a

flat upper surface and adapted to rest upon a horizontal surface, a head carried thereby, a main operating shaft carried by the head, a driven pulley associated with the main operating shaft, a motor secured within and enclosed by a hollow portion of the base extending horizontally beyond the head, said motor having a drive pulley supported on the shaft thereof also enclosed by the base portion and speed reduction means associated with the motor and enclosed by the base, there being a belt connecting said first named pulley with the speed reduction means, and a second belt connecting the drive pulley with the speed reduction means.

4. In a portable sewing machine having an operating shaft and power transmitting mechanism associated therewith, the combination of a frame member comprising a hollow base portion having a flat upper surface and adapted to rest upon a horizontal surface, a motor secured within the base and completely enclosed thereby, said motor being mounted transversely of the base and at one end thereof, and intermediate speed reducing means associated with the motor and also completely enclosed by the base, said speed reducing means drivingly connecting the motor to such power transmitting mechanism.

5. In a portable sewing machine, the combination with a sewing machine frame having a head portion and a hollow base portion, a main operating shaft supported by the head, shuttle bar mechanism disposed within the hollow base portion, connecting means between the shuttle operating mechanism and the operating shaft, a driving pulley associated with said operating shaft and disposed at one end of the head, a motor drive mechanism mounted within the hollow base portion at one end of the shuttle operating mechanism and enclosed by the base portion including a motor with its armature shaft disposed transversely of the base, a speed reducing mechanism having a pulley with its axis longitudinal of the base and also enclosed thereby, and power transmitting connections between the last mentioned pulley and the armature shaft of the motor and between said pulley and the operating pulley of the sewing machine.

6. In a portable sewing machine, the combination of a sewing machine frame having a head portion and a hollow base portion, needle bar actuating mechanism supported by the head, an operating pulley associated with the needle bar actuating mechanism, a motor drive mechanism mounted within the base and entirely enclosed thereby and comprising a motor with its armature shaft disposed transversely of the base, speed reducing means associated therewith having a pulley with its shaft longitudinal of the base, a belt connecting said pulley with the pulley of the sewing machine, a second belt pulley alongside and rigid with the mentioned pulley of the motor drive, a belt pulley on the armature shaft, a belt connecting said second pulley with the pulley on the armature shaft and guide pulleys for the last mentioned belt.

7. In a portable sewing machine, the combination of a sewing machine frame having a head portion and a hollow base portion, needle bar actuating mechanism supported by the head portion including an elevated driving pulley on a longitudinal axis, a motor enclosed within the hollow base portion having its axis transverse to the base, a pulley on the armature shaft of the motor, a driven pulley mounted in the hollow base, guide pulleys within the hollow base, an endless belt connecting the armature pulley with the driven pulley and extending across said guide pulleys to another pulley rigid with the driven pulley, and a belt connecting said driven pulley with the sewing machine pulley.

8. In a portable sewing machine, the combination with a sewing machine frame having a head portion and a hollow base portion, sewing machine operating mechanism supported thereby, a motor enclosed within the hollow base having its axis transverse to the base, a pulley on the armature shaft of the motor, a driven pulley mounted in the hollow base, guide pulleys in the hollow base, an endless belt connecting the armature pulley with the driven pulley and extending across said guide pulleys, means connecting said driven pulley with the sewing machine operating mechanism, a pivot arm supporting said driven pulley, and a spring on said arm to apply tension to the belt connecting the driven pulley with the armature pulley.

In testimony whereof, I hereunto affix my signature.

ARTHUR T. MACE.