Sept. 12, 1967 A. N. COOK ET AL 3,340,835

SEWING MACHINE MOTOR MOUNTS

Filed Oct. 1, 1965 2 Sheets-Sheet 1

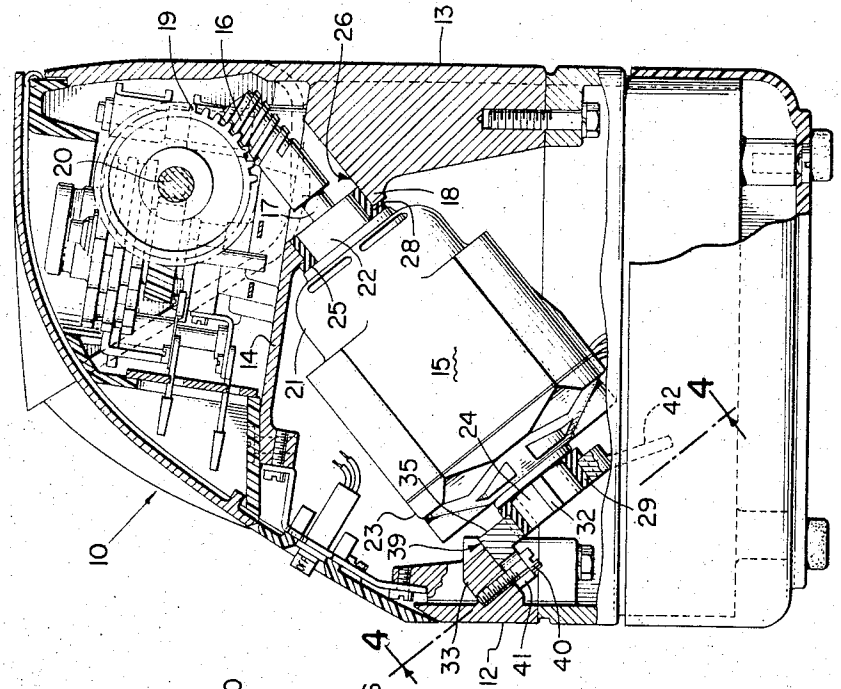


Fig. 2.

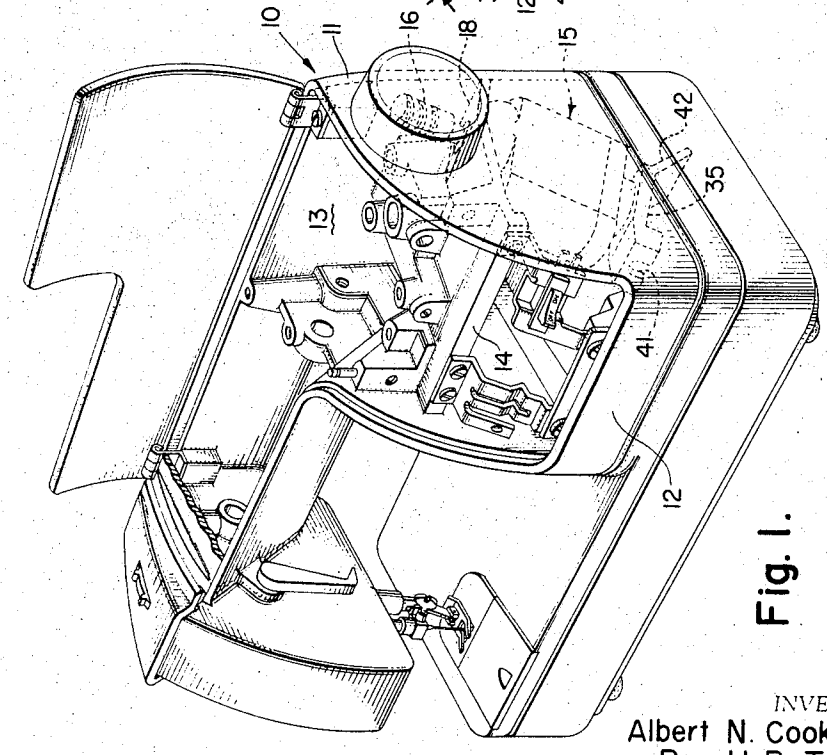


Fig. 1.

INVENTORS
Albert N. Cook and
Ronald R. Thompson.

WITNESS
Nicholas Leszczak

BY
Marshall J. Breen
ATTORNEY

Sept. 12, 1967 A. N. COOK ETAL 3,340,835

SEWING MACHINE MOTOR MOUNTS

Filed Oct. 1, 1965 2 Sheets-Sheet 2

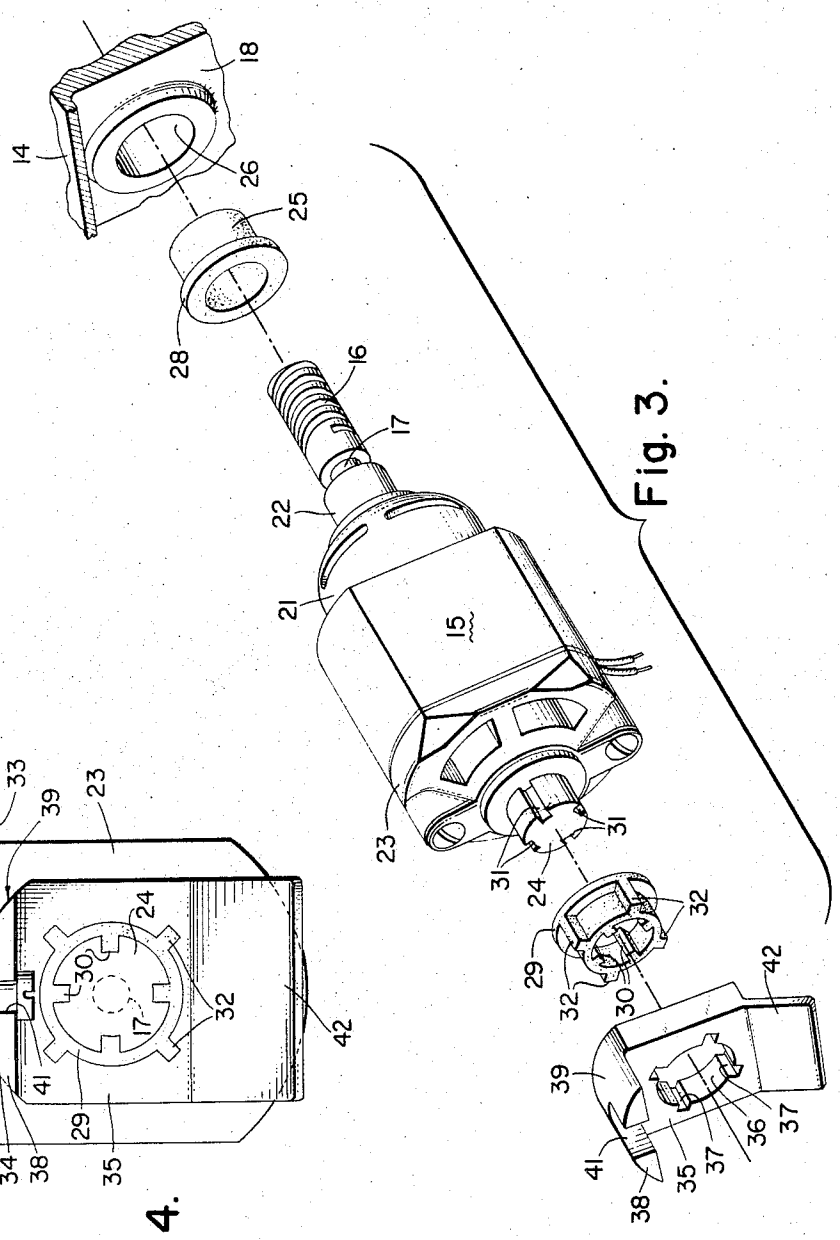


Fig. 3.

Fig. 4.

INVENTORS
Albert N. Cook and
Ronald R. Thompson.

WITNESS
Nicholas Leszczak

Marshall J. Breen
ATTORNEY

United States Patent Office 3,340,835 Patented Sept. 12, 1967

3,340,835

SEWING MACHINE MOTOR MOUNTS

Albert N. Cook, Madison, and Ronald R. Thompson, Pluckemin, N.J., assignors to The Singer Company, New York, N.Y., a corporation of New Jersey

Filed Oct. 1, 1965, Ser. No. 492,253
4 Claims. (Cl. 112—220)

This invention relates to means for adjustably and removably mounting an electric motor for gear drive within the frame of a sewing machine and more especially relates to structural features thereof which provide ease of assembly productive not only of a resilient mounting but also of a stable and proper gear mesh.

The modern high-quality family sewing machine today invariably uses a built-in electric motor with a gear drive. With the constant demand for an ever increasing variety of stitch types, the internal mechanism has now become quite complex and the space available for manipulation and mounting of the motor during assembly has accordingly been reduced.

It becomes important therefore to devise an effective motor mount which shall be simple in assembly, use a minimum number of parts and preferably requires only a single easily accessible securement for proper installation in a sewing machine for driving same through a gear transmission. It is especially important, that such a motor mount provide simple means for inherently securing and maintaining a proper gear mesh so that the maximum motor torque is available for driving the sewing mechanisms.

The above requirements are satisfied by structure according to this invention, which structure provides limited torsional resilience about the motor shaft axis for noise reduction but maintains rigid alignment for proper gear mesh and accommodates nominal variations in motor length, requiring but a single easily accessible fastening element.

It is an object of this invention, therefore, to provide simple means for resiliently mounting an electric motor with a gear drive within the frame of a sewing machine with special means for inherently securing and maintaining proper gear mesh.

It is a further object of this invention to provide means for adjustably securing an electric driving motor within the frame of a sewing machine, which mount requires the use of a single easily accessible fastening element.

Other objects of this invention will readily be apparent when the following description is considered in connection with the accompanying drawings:

In the drawings:

FIG. 1 is a perspective view of a sewing machine frame showing the general arrangement of the motor mount with respect thereto.

FIG. 2 is a side elevational view, partly in section, taken through the frame of FIG. 1 showing an embodiment of the motor mount of this invention.

FIG. 3 is an exploded perspective view of the parts of the motor mount of FIG. 2.

FIG. 4 is a detailed sectional view taken substantially on the line 4—4 of FIG. 2.

An embodiment of the motor mount of this invention is applied within the stylized frame **10** of a sewing machine as shown generally in FIG. 1. The frame **10** forms the subject matter of a copending United States patent application Ser. No. 463,677, filed June 14, 1965 and assigned to the same assignee as the present invention. Reference to the above may be had for a full understanding of the construction of frame **10**.

It is sufficient for the purposes of the present invention to note that the upright arm portion **11** of frame **10** includes a vertical front wall **12**, a vertical rear wall **13**, and a horizontal platform **14**, all being cast integrally.

An electric driving motor **15** having housings **21** and **23** is mounted in an inclined position within the upright arm portion **11** between the front and rear walls **12** and **13** as best seen in FIG. 2. A worm **16** secured to shaft **17** of the motor **15** extends through a rearwardly inclined and apertured portion **18** of the horizontal platform **14** to drivingly engage a gear **19** fixed to an arm-shaft **20** which drives the sewing mechanism (not shown). This inclined position permits close coupling between the motor **15** and the gear **19** and simplifies the motor construction by eliminating the need for a long shaft extension between the armature of motor **15** and the worm gear **16**. This close coupling also maintains better alignment for proper gear mesh.

The housing **21** of motor **15** is formed with a smooth cylindrical hub **22** of reduced diameter. The housing **23** is also formed with a cylindrical hub **24** of reduced diameter. The cylindrical hub **24**, however, is interrupted by peripherally-spaced grooves **31** aligned with the shaft axis. The cylindrical hubs **22** and **24** are made coaxial with the bearing-receiving bores in their respective housings **21**, and **23**, so that, when assembled, the motor **15** presents two axially-spaced cylindrical hubs coaxial with the shaft axis.

A flanged bushing **25** made of resilient material is seated on the cylindrical hub **22** and is received in a smooth cylindrical bore **26** made in the inclined portion **18** of the horizontal platform **14**. The flange **28** of bushing **25** lies between the housing **21** and the inclined portion **18** to provide a nominal axial spacing which is in no sense critical with respect to proper meshing of gears **16** and **19**. The bushing **25** fits snugly within the bore **26** and is a push fit on the cylindrical hub **22** for ease of assembly but this structure of itself will not frictionally support the full torque reaction necessary to drive the arm-shaft **20**.

A flanged bushing **29** of resilient material is seated on the cylindrical hub **24** and is formed with inwardly extending axial ribs **30** which mate with the grooves **31** in the hub **24**. Outwardly extending axial ribs **32** are formed on the bushing **29**.

The vertical front wall **12** is formed with a boss **33** having an open semi-cylindrical seat **34** formed therein by counter boring with respect to the bore **26** during machining of the casting. The seat **34** thus formed is coaxial with the bore **26** and with an imaginary axis, which upon assembly, coincides with the motor shaft axis.

A removable clamp bracket **35** as best seen in FIG. 3 is formed with a cylindrical bore **36** having outwardly extending grooves **37** which mate with and receive the axial ribs **32** on the bushing **29**. The bracket **35** also has an outer portion **38** of extended axial dimension and providing a semi-cylindrical peripheral surface **39** which is coaxial with the bore **36** and receivable on seat **34**. A headed screw **40** passes through a slot **41** made in the outer portion **38** and is threaded into the boss **33** for clamping the bracket **35** to the boss **33** when properly seated. The slot **41** provides limited adjustment of the bracket in a direction along the motor shaft axis. A depending finger-piece **42** facilitates the handling of the bracket **35** during assembly.

It will be understood that the ribs **30** and **32** formed on the bushing **29** cooperate with the grooves **31** and **37** formed respectively in the hub **24** and the bracket **35** to form a resilient connection between the motor **15** and the stationary bracket **35**, which connection has limited torsional resilience but is capable of supporting the full driving torque of the motor by shear stress set up in bushing **29**.

The fact that the bushing **25** is rotatable on the hub

22 and in the bore 26 provides easy manipulation of the motor for aligning the ribs 32 in the grooves 37. That is to say there is substantially no resistance at the gear end of the mount to turning of the motor bodily about the shaft axis necessary to align ribs 32 in grooves 37 and at the same time to seat surface 39 properly on the seat 34 inherently to fix the alignment of the shaft axis with respect to the pitch line of gear 19.

When this has been done, the bracket 35 is pushed along the shaft axis as permitted by the slot 41 and screw 40 and with surface 39 of bracket 35 firmly against seat 34 until all axial motion is taken up and the bushings 25 and 29 are fully seated on the respective hubs 22 and 24 and within the respective bores 26 and 36. It will be seen that, with this construction, motors having nominal variations in length due to manufacturing tolerances can easily be accommodated without adversely affecting the proper gear mesh which is fixed inherently by the seating of surfaces 39 and 34 as above explained.

The fact that the bushings 25 and 29, in their confined states in this assembly, do not yield substantially in compression means that the proper alignment for gear mesh, when once secured, will be maintained indefinitely, the torsional resilience merely permitting a slight rotation of the motor about the shaft axis, which rotation does not adversely affect the gear mesh but does provide desirable isolation of motor noise.

With the bracket 35 removed, it is evident that the motor 15, with bushing 25 in place on hub 22 and bushing 29 in place on hub 24, can be installed from below with the shaft end projecting through the apertured portion 18 and the bushing 25 seated in bore 26. Then the bracket 35 is applied to seat 34, the motor 15 rotated bodily to align ribs 32 with grooves 37 after which the bracket 35 is pushed into firm engagement with bushing 29 seated in bore 36 and the screw 40 is finally tightened to lock the entire assembly.

Having thus described the nature of the invention, what is claimed herein is:

1. Apparatus for removably supporting an electric motor within the frame casting of a sewing machine having a vertical front wall, a vertical rear wall and a horizontal platform therebetween comprising a rearwardly and downwardly inclined portion of said horizontal platfor joining said rear wall and having a cylindrical aperture formed therein, a rearwardly and upwardly inclined portion of said front wall extending normally toward said downwardly inclined portion and having an open semi-cylindrical seat formed therein coaxially with said cylindrical aperture, a first flanged resilient bushing received in said cylindrical aperture, a bracket having an inner cylindrical aperture and an outer peripheral portion formed coaxially with said inner cylindrical aperture, said outer peripheral portion being received on said open semi-cylindrical seat, means removably securing said barcket on said seat, and a second flanged resilient bushing received in said inner cylindrical aperture, said first and second resilient bushings adapted to seat cylindrical end hubs of a motor shaft.

2. Apparatus according to claim 1 wherein the means removably securing said bracket on said seat includes slot and screw means providing translational positioning of the bracket relative to the seat.

3. Apparatus according to claim 1 wherein said second flanged bushing includes circumferentially-spaced radial portions and said inner cylindrical aperture of said bracket includes mating portions interengaging said circumferentially-spaced radial portion to support the driving torque reaction between the motor and the bracket.

4. Apparatus according to claim 3 wherein said circumferentially-spaced radial portions and said mating portions of said bracket are ribs and grooves, respectively.

References Cited

UNITED STATES PATENTS

2,617,375 11/1952 Peets ..... 112—220

FOREIGN PATENTS

636,409 1/1928 France.

JORDAN FRANKLIN, *Primary Examiner.*

G. H. KRIZMANICH, *Assistant Examiner.*