

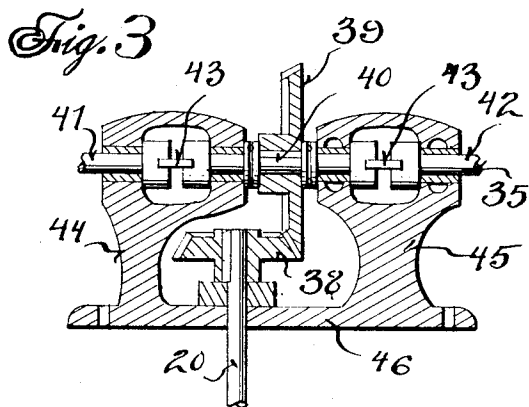
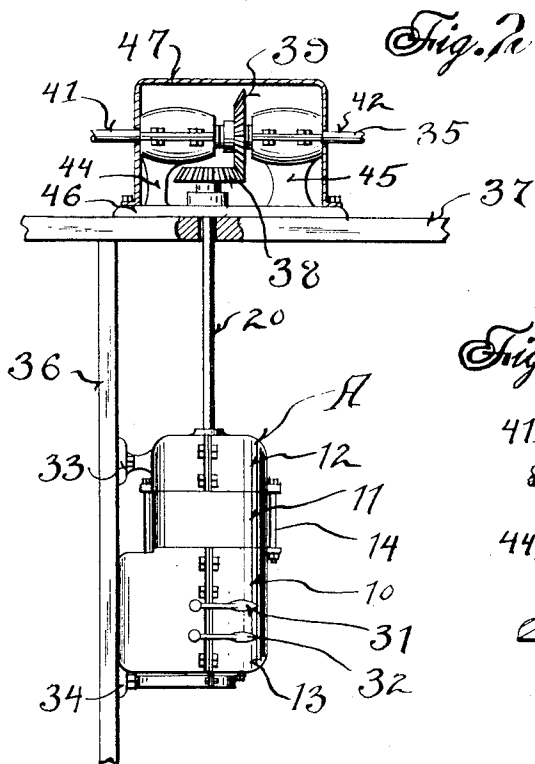
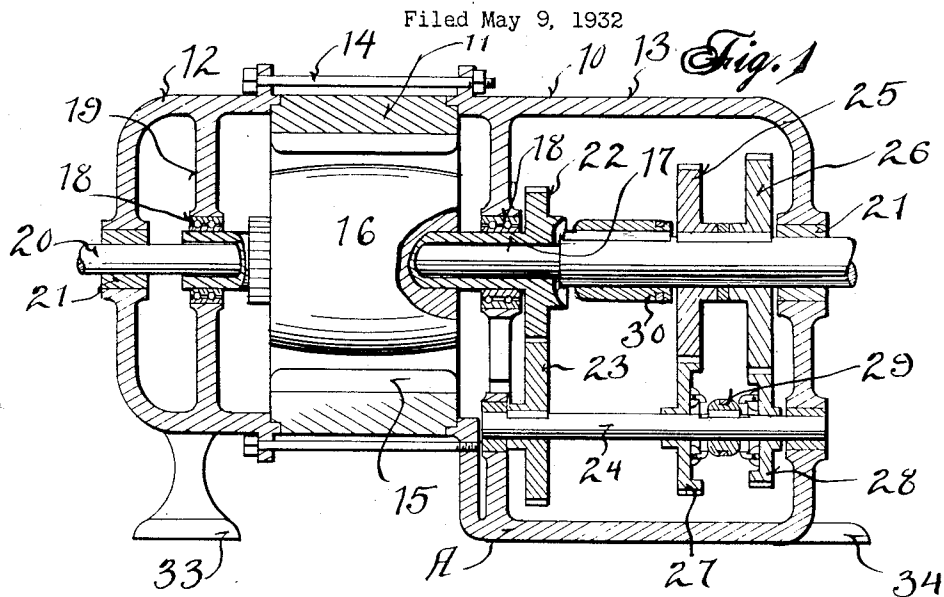
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POWER UNIT

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## UNITED STATES PATENT OFFICE

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## POWER UNIT

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1 Claim. (Cl. 172—36)

This invention appertains to power drive units and more particularly to a novel device which is particularly susceptible for use in connection with lathes and other woodworking machinery.

One of the primary objects of my invention is the provision of an electric drive power unit which can either be used in a vertical or a horizontal plane and in which the necessity of employing power drive belts and the like is entirely eliminated.

A further important object of my invention is the provision of an electric power drive unit for woodworking machines, which can be disposed below the work table, so as to be entirely out of the path of all of the woodworking tools, thereby allowing the effective manipulation of the work irrespective of the actual sizes thereof.

A further salient object of my invention is the provision of an electric power transmission unit in which novel means is provided for obtaining various different speeds, the device, however, being susceptible for use in conjunction with electric motors in which the drive shaft thereof can be actuated at different driving speeds without the necessity of employing speed changing mechanism.

A further object of my invention is the provision of an electric power transmission drive device for lathes and other woodworking tools in which the electric motor is adapted to be positioned in a vertical plane for driving the line shaft, without the use of drive belting or the like, novel means being incorporated in the shaft, whereby the drive is free to give without danger to the gearing, should the shaft become overloaded or subjected to undue strain.

A still further object of my invention is to provide an electric power transmission unit for lathes and other woodworking machines of the above character, which will be durable and efficient in use, one that will be simple and easy to manufacture, and one which can be incorporated with a conventional lathe and other woodworking machines at a small cost.

With the above and other objects in view, the invention consists in the novel construction, arrangement and formation of parts, as will be hereinafter more specifically described, claimed and illustrated in the accompanying drawing in which drawing:

Figure 1 is a longitudinal section through my improved electric power transmission drive unit.

Figure 2 is a fragmentary side elevation of the drive unit showing the same applied to a wood-

working machine, part of the device being shown broken away and in section.

Figure 3 is a detail fragmentary longitudinal sectional view illustrating the novel means employed for connecting the electrical drive unit with the drive shaft without the use of belts or the like.

Referring to the drawing in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter A generally indicates my improved electric power drive unit which can be employed in conjunction with any desired type of machinery, such as a lathe or other woodworking tool. The improved power drive unit A is particularly constructed, so that the same can be used in either a horizontal or a vertical plane, as illustrated in Figures 1 and 2.

As shown, the power drive unit A comprises a casing 10, which may include a central unit 11, and end units 12 and 13. These units can all be connected together as a unitary device, by suitable bolts 14. The central unit 11 constitutes the electric drive motor, which may comprise the coils 15 and the rotatable armature 16. The armature 16 is connected in any desired manner with the hollow drive shaft 17 which may be rotatably supported in suitable ball-bearings or the like 18 carried by the partition plates 19 of the end sections 12 and 13. The electric drive motor unit 11 may be of any convenient construction and has been shown more or less diagrammatically and can be provided with the usual or any preferred type of commutator. Rotatably mounted within the hollow drive shaft 17 is the longitudinally extending driven shaft 20 and this driven shaft 20 is rotatably carried in suitable bearings 21 carried by the end walls of the end sections 12 and 13. The driven shaft 20 can be extended, for operating any preferred type of device as will be later set forth.

Formed on the hollow drive shaft 17 is the spur gear 22 which is constantly in mesh with a spur gear 23, keyed or otherwise secured to the counter-shaft 24. The inner face of the spur gear 22 has formed thereon the female section of a clutch, the purpose of which will be later set forth. This counter-shaft 24 is rotatably mounted in any desired type of bearings supported by the end section 13 of the casing.

In order to bring about the driving of the shaft 20 at any desired rate of speed, speed gears 25 and 26 of different diameters are keyed or otherwise secured to the said driven shaft. Rotatably mounted upon the countershaft 24 are the speed

gears 27 and 28, which are constantly in mesh with the speed gears 25 and 26 respectively. Feathered or splined upon the counter-shaft 24 between the speed gears 27 and 28 is a clutch section 29, which is adapted to be selectively moved into engagement with either one of the gears 27 or 28, so as to bring about the rotation thereof with the counter-shaft. Obviously, by shifting the clutch section 29 into engagement with either one of the gears 27 or 28, the driven shaft can be actuated at different speeds. When it is desired to operate the driven shaft directly from the electric drive motor, a clutch section 30 can be splined or feathered on the driven shaft 20 can be moved into locking engagement with the hollow drive shaft 17. Any desired type of means can be employed for operating the clutch sections 29 and 30 and as shown hand levers 31 and 32 are provided for this purpose, which can be operatively connected to the clutches by means of suitable yokes or the like.

From the description so far, it can be seen that I have provided a novel power drive device which can be handled as a single unit and which can be readily associated with a work table or frame either in a horizontal or a vertical plane. In order to facilitate the attachment of the device with the table or frame of a machine, the frame or casing section 12 can be provided with an attaching standard 33, while the section 13 can be provided with attaching lugs 34.

It is preferred to construct the driven shaft 20 relatively long, so that the necessity of providing reduction cones and pulley belts can be eliminated.

By referring to Figures 2 and 3 of the drawing, it will be noted that novel means is provided for actuating a line shaft 35 of a woodworking tool. While I have referred to the shaft 35 as a line shaft, it is to be understood that this shaft may be a mandrel shaft or the like. When the power drive device is disposed in a vertical plane, the standard 33 and the ears 34 can be bolted to one of the uprights 36 of the frame of the woodworking machine and the shaft 20 can be extended through the table 37 of the machine. In this instance the upper end of the shaft 20 can be provided with a beveled gear 38 which meshes with a similar beveled gear 39 keyed or otherwise secured to the shaft 35.

It is preferred to construct the shaft 35 in a novel manner, so that undue strain on the drive motor and gearing will be eliminated. Thus, the shaft 35 may include an intermediate section 40

and side sections 41 and 42. The sections are connected together by frangible keys or couplings 43. The gear 39 is connected with the intermediate section 40 of the shaft 35. A pair of spaced bearings 44 and 45 are rigidly connected with a base plate 46 which can be bolted to the table of the woodworking machine. These bearings effectively support the ends of the shaft sections, so that all of the shaft sections will be effectively held in place, should the shafts break at their joints for any reason. The bearings 44 and 45 are made in companion sections whereby access can be readily had to the frangible keys or couplings 43. Should the shaft 35 become overloaded or subjected to sudden undue strain which might tend to injure the motor or gearing, the keys or couplings 43 will brake and thereby prevent the transmission of such strains to the gearing.

Any preferred type of casing 47 can be bolted to the table 37 for housing the beveled gears 38 and 39 and the bearings for the shaft 35.

From the foregoing description, it can be seen that I have provided an exceptionally simple power drive and transmission unit, which is of a substantially universal nature, in that the same can be readily used in different planes for operating different types of tools.

Changes in detail may be made without departing from the spirit or the scope of this invention, but what I claim as new is:

A portable power driving transmission unit comprising a three-part casing including end and intermediate sections, means rigidly and detachably connecting said sections together, an electric motor housed within the intermediate section, bearings carried by the inner ends of the end sections, a hollow armature shaft for the motor rotatably mounted within the bearings, a driven shaft rotatably mounted within the hollow shaft and extending beyond the casing, bearings carried by the outer walls of the end sections rotatably supporting the driven shaft, a counter-shaft rotatably mounted in one of the end sections, intermeshing gears keyed respectively to the hollow shaft and the counter-shaft, means for clutching the driven shaft with the hollow shaft, a set of speed gears keyed to the driven shaft, a set of speed gears rotatably mounted on the counter-shaft, and means for selectively clutching the desired speed gear on the counter-shaft therewith, and means connected with the casing for facilitating the connection thereof with an actuating machine.

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