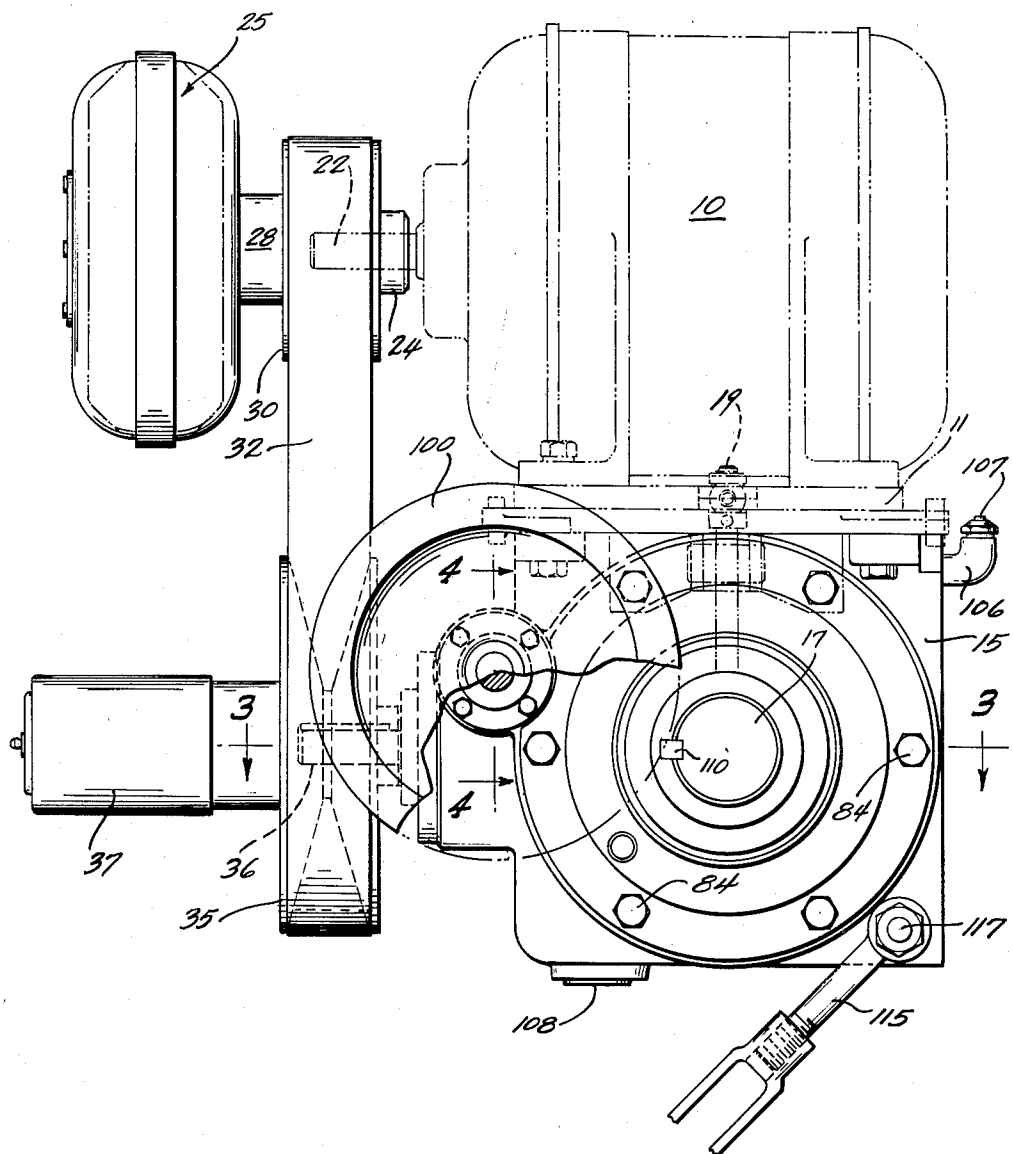
Jan. 31, 1956 W. P. SCHMITTER ET AL 2,732,731

COTTON CARD ENGINE DRIVES

Filed Nov. 30, 1951 4 Sheets-Sheet 1

Fig. 1



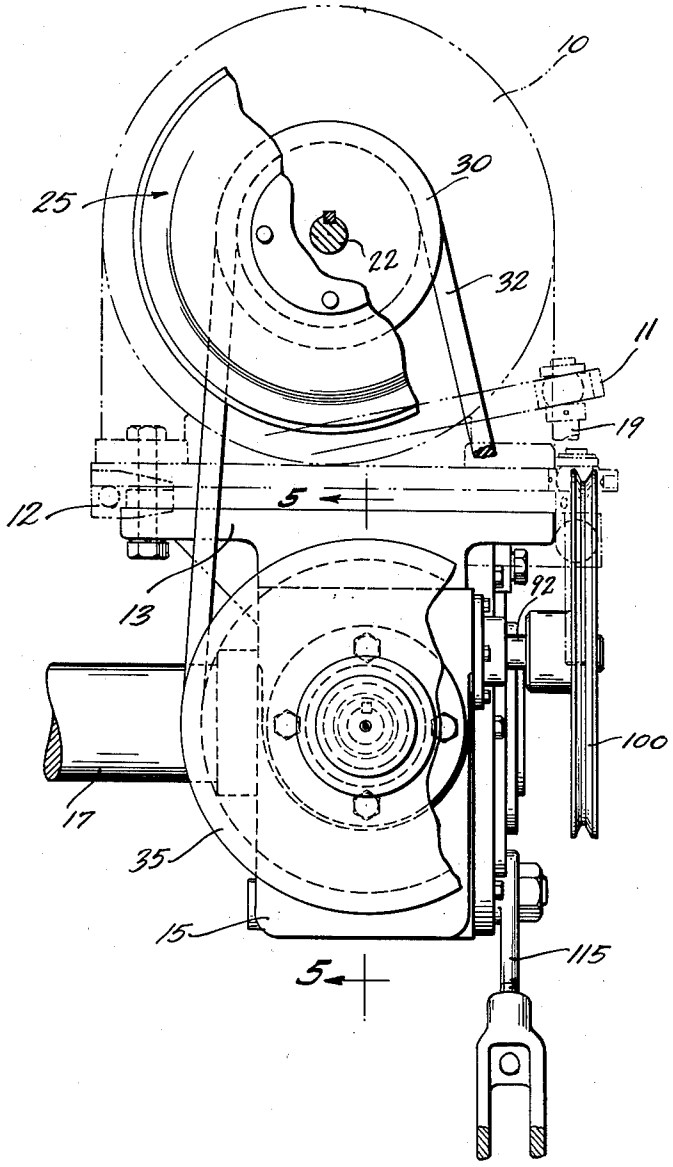
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Filed Nov. 30, 1951 4 Sheets-Sheet 2

Fig. 2



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Filed Nov. 30, 1951 4 Sheets-Sheet 3

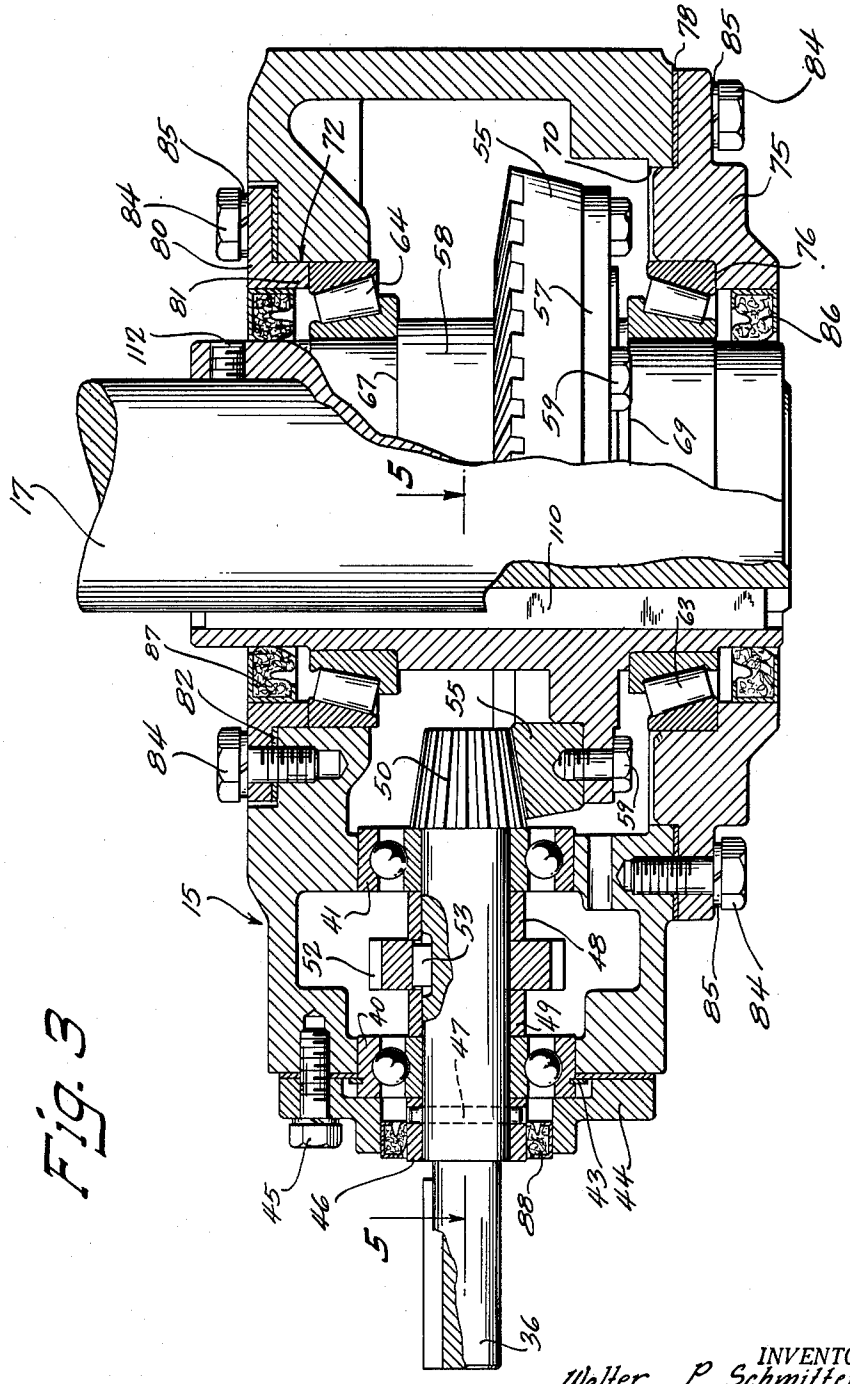


Fig. 3

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Filed Nov. 30, 1951 4 Sheets-Sheet 4

Fig. 4

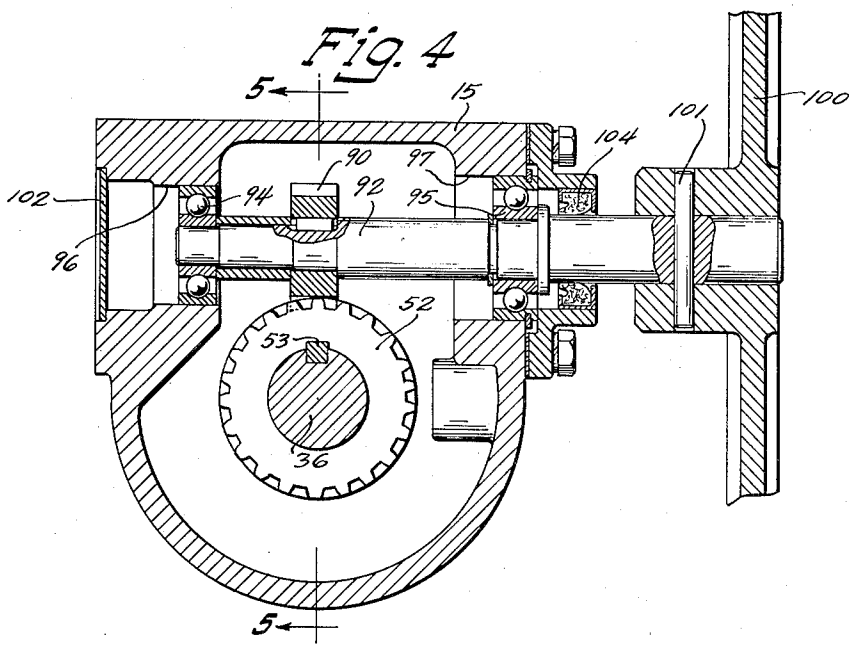
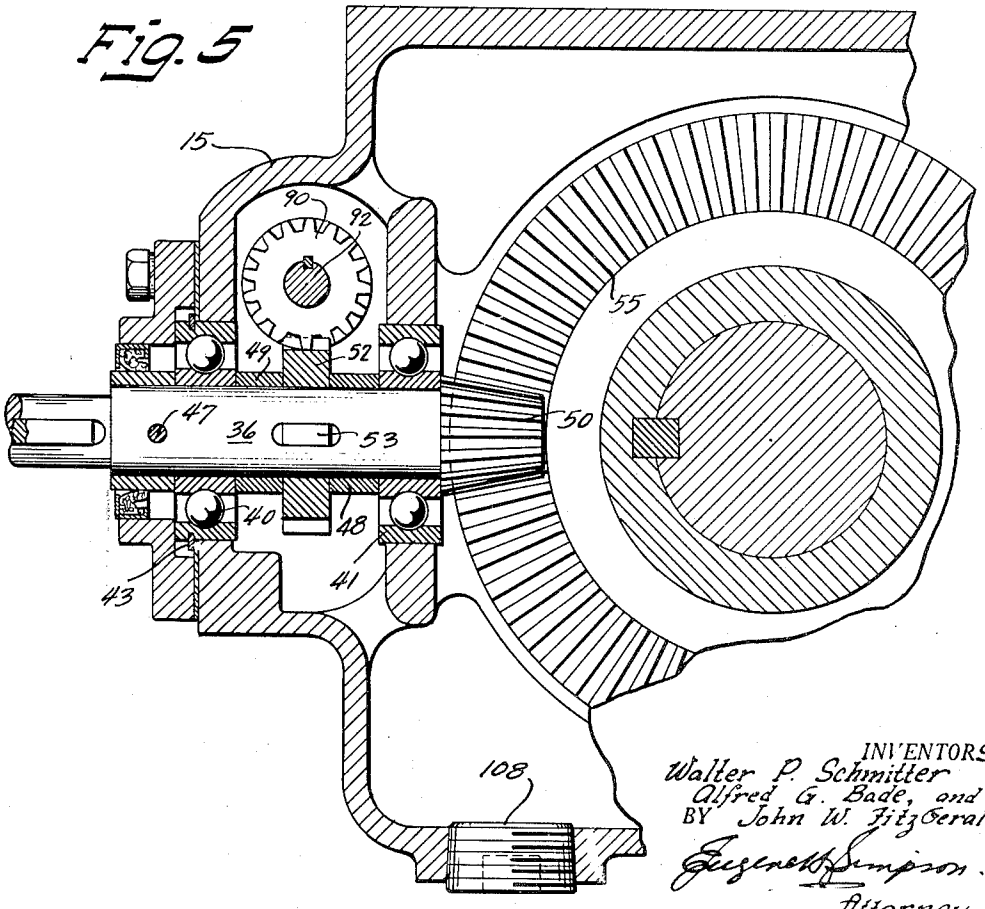


Fig. 5



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COTTON CARD ENGINE DRIVES

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Application November 30, 1951, Serial No. 259,122

7 Claims. (Cl. 74—665)

This invention relates to a drive for a rotary cotton card engine.

In cotton card engines it is the usual practice to have overhead shafting with a central motor to drive a plurality of card engines through the common overhead shafting. This system has the obvious disadvantages of dirt and dust falling from the overhead shaft onto either the lap or the web. The overhead shaft also limits light and ventilation in the plant and restricts plant modernization. Further, should the central motor fail, the entire plant is shut down until such time as repairs can be made.

Some attempts have been made to install individual motor drives on card engines. Such drives, however, have been cumbersome and usually require special brackets fixed to the frame of the card cylinder. When a motor is mounted on such a bracket any change in tension in the belt is immediately transmitted to the card engine frame causing distortions therein which cause misalignment of the various rollers in the card engine.

It is an object of the present invention to provide an individual drive for a rotary card engine which does not require a special bracket on the engine.

Another object is to provide an individual motor drive for a rotary card engine which will occupy a minimum of floor space.

Another object is to provide an individual motor drive for a rotary card engine which will permit the use of a standard motor such as a squirrel cage motor.

Another object is to provide an individual motor drive for a rotary card engine which will minimize the effect of enertia of the engine.

A further object of the invention is to provide an individual motor drive for a rotary card engine which has an improved stripper pulley.

A further object is to provide an individual motor drive for a rotary card engine, or the like, having an improved gear arrangement.

A further object is to provide an individual motor drive for a rotary card engine, or the like, which will make adjustments in speed automatically.

A still further object of the invention is to provide an individual motor drive for a rotary card engine, or the like, having a low starting torque.

A still further object is to provide a card engine drive including an adjustable speed mechanism.

A still further object is to provide an individual drive for a cotton card engine in which changes in tension of the drive belt do not cause distortion of the card engine frame.

Still further objects will become apparent upon considering the following specification which, when considered in conjunction with the accompanying drawings, illustrates a preferred form of the invention.

In the drawings:

Fig. 1 is a side elevational view of the card engine drive, being a view looking parallel to the axis of the card cylinder;

Fig. 2 is an end elevational view of the card engine drive shown in Fig. 1, and is a view looking at the drive from the left as seen in Fig. 1;

Fig. 3 is a horizontal cross-section through the gear box, taken on the line 3—3 of Fig. 1, looking in the direction of the arrows;

Fig. 4 is a cross-section taken on the line 4—4 of Fig. 1, looking in the direction of the arrows; and

Fig. 5 is a cross-section taken on the line 5—5 of Fig. 4, looking in the direction of the arrows.

Referring to the drawings, and particularly to Figs. 1 and 2, the motor 10 is mounted on a base 11. The base 11 is pivotally mounted by hinges 12 (Fig. 2) on a platform 13 of a gear housing 15, the housing 15 being supported directly on the main drive shaft 17 (Fig. 3) of the card engine (not shown) in a manner to be described below. The edge of the base 11 opposite the hinges 12 is provided with an adjusting screw 19 which permits the base 11 to be held in adjusted angular relationship to the gear housing 15.

The motor 10 has a shaft 22 which is keyed in the end of a shaft 24. The shaft 24 is thus driven by the motor 10 and rotates the driving element of a hydraulic transmission 25. The driving element of the transmission 25 transmits its power through the medium of the oil in the transmission 25 to the driven element, the driven element being keyed or otherwise fixed to a quill shaft 28 which is mounted on and concentric with the shaft 24.

A pulley 30 is fixed to the shaft 28 to be driven thereby. The pulley 30 is of the V-belt type and carries a V-belt 32 which drives an adjustable spring-actuated pulley 35. The pulley 35 is keyed onto the drive shaft 36 of the gear drive.

The pulley 35 is adjusted to variable speeds by a spring encased in a housing 37 which adjusts the pulley and changes the drive ratio automatically as the angle of the motor is varied by adjustment of the screw 19. Thus adjustment of the motor by the adjusting screw 19 varies the tension on the belt 35 and causes a change in speed of the shaft 36 to vary the speed of the card engine drive shaft 17.

Referring now to Fig. 3, the shaft 36 is mounted in bearings 40—41 in the gear case 15. The gear 40 has a snap ring 43 on the exterior thereof which ring is forced against the end of the gear housing 15 by the pressure of an end cap 44 on the outer race of the bearing 40. The end cap 44 is held in position on the end of the gear casing 15 by a plurality of machine screws 45, or the like.

A sleeve 46 is mounted on the shaft 36 and is held in fixed axial position by a groove pin 47. The inner races of the bearings 40 and 41 are held between the sleeve 46 and a spiral bevel gear 50 by a pair of spacer rings 48 and 49 and a 45° spiral gear 52 which is secured to the shaft 36 by a key 53.

The bevel gear 50 drives a bevel ring gear 55 which is secured to a flange 57 on a quill shaft 58 by a plurality of bolts 59.

The quill shaft 58 is mounted in the casing between a pair of Timkin roller bearings 63—64.

To assemble the quill shaft 58 and gear 55, the bearing 64 is put in position on the quill shaft 58 with the inner end of the inner race abutting a shoulder 67 on the shaft. The bearing 63 may also be positioned on the quill shaft with the inner end of the inner race abutting a shoulder 69 on the shaft. The assembled quill shaft and bearings may then be inserted in the casing 15 through an aperture 70 until the bearing 64 enters an aperture 72 in the housing 15 directly opposite the aperture 70. The outer race of the bearing 64 seats in the aperture to permit the gear 55 to be engaged with the gear 50.

When the gears 50 and 55 are properly engaged, a cap 75 may be inserted over the end of the quill shaft 58 so

that the outer race of the bearing 63 seats in a recess 76 in the cap 75. Suitable shims 78 may be inserted between the cap 75 and the housing 15 to eliminate back lash in the gears 50—55 and to properly load the bearing 63.

A second cap 80, having an inturned collar 81, may then be set in place about the aperture 70 with sufficient shims 82 interposed between the cap 80 and the casing to properly load the bearing 63. The caps 75 and 80 may be bolted to the housing 15 by machine screws 84. Lock washers 85 prevent the machine screws 84 from loosening under vibration.

Oil is prevented from leaking from the casing 15 through the bearings 63 and 64 by a pair of oil seal rings 86 and 87, and is prevented from leaking from the bearing 40 by an oil seal ring 88.

Referring now to Figs. 4 and 5, the shaft 36 drives the 45° spiral gear 52. The gear 52 is in constant mesh with a 45° spiral gear 90. The gear 90 is mounted on a shaft 92 carried between bearings 94 and 95 supported in apertures 96 and 97, respectively, in the casing 15. The shaft 92 is parallel to the quill shaft 58 and extends through the casing 15 and projects therepast to support a brush pulley 100. The pulley 100 is held on the shaft by a drift pin 101, or the like.

The aperture 96 at one end of the shaft 92 is sealed by a plug 102 which prevents the escape of oil, while an oil seal 104 surrounds the projecting end of the shaft 92 to prevent leakage of oil through the aperture 97 and through the bearing 95.

After the assembly of the entire unit the casing 15 may be filled with oil through the elbow 106 (Fig. 1) which elbow has a cap 107 to provide for venting of gases from the casing.

A plug 108 (Figs. 1 and 5) in the bottom of the casing 15 provides a means to drain oil from the casing 15 and to flush the dirt from the casing.

The assembled unit, described above, may be mounted to drive the card engine by inserting the card engine drive shaft 17 into the quill shaft 58 and securing it against rotation by a suitable key 110 (Fig. 3). A set screw 112 retains the drive unit in place on the shaft 109.

A torque arm 115 (Fig. 1) is secured to one edge of the casing through a stud 117 and to the card engine frame (not shown) or to the floor (not shown) to prevent rotation of the drive unit about the shaft 17.

Operation

In operation, the drive unit is inserted on the card engine with the quill shaft 58 over the main shaft 17 of the card engine (not shown). The torque rod is then connected between the bolt 117 and a portion of either the foundation or a stationary part of the card engine. The torque rod is tightened until the drive unit is vertical on the shaft 17.

When the motor is connected it drives one unit of the hydraulic transmission 25 which, in turn, drives the pulley 30 through the hollow shaft 28. The pulley 30 drives the pulley 35 through the V-belt 32, adjustments in speed being made by varying the position of the motor base 11 through the screw 19, the speed adjustments being automatically accomplished by the spring adjusting mechanism 37. The spring adjusting mechanism 37 permits variations of the pulley cones 35 in accordance with the tightness of the belt 32.

The pulley 35 drives the shaft 36 on which is mounted the bevel gear 50. The gear 50 is in constant mesh with the gear 55 carried by the quill shaft 58 so that rotation of the gear 50 turns the gear 55 and the quill shaft 58, driving the card engine (not shown).

The shaft 36 also has mounted on it the 45° spiral gear 52 so that turning the gear 52 drives the second 45° spiral gear 90 the center of rotation of which lies at right angles to the shaft 36 and parallel to the quill shaft 58. The shaft 92 carrying the gear 90 drives a pulley 100.

After the card engine has run for about thirty-six hours, the swift, workers, strippers and doffers become choked up with both cotton and foreign matter, which reduces efficiency. When this occurs the swift must be cleaned. To clean the swift a fettling roll is placed adjacent the swift and the power to the machine shut off. A belt is connected between the pulley 100 and a similar pulley on the fettling roll. The momentum of the card engine is sufficient to continue its movement and to drive the fettling roll to clean the swift.

By having the entire card engine drive mounted directly on the main drive shaft of the card engine, all stresses due to variations in tension of the belt are absorbed by the frame of the card engine drive and are not transmitted to the card engine frame, which would cause distortions resulting in misaligned rolls in the card engine.

It will be realized that the hereinbefore described form of the invention is given merely by way of example and that various changes in size, shape and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

That which is claimed as new and is desired to be secured by United States Letters Patent is:

1. In a cotton card engine or the like having a main drive shaft, a drive unit for said card engine comprising, a quill shaft received on said main drive shaft, means to transmit rotation from said quill shaft to said drive shaft, a casing carried by said quill shaft, a bevel gear fixed on said quill shaft in said casing, a transmission shaft mounted in said casing, a bevel gear on the inner end of the transmission shaft in mesh with the first named bevel gear, a motor carried by said casing, means including a flexible belt to drive the transmission shaft from the motor, and means to adjust the angular position of the motor on the casing to vary the speed of the quill shaft.

2. In a cotton card engine, or the like having a main drive shaft, a drive unit for said card engine comprising, a quill shaft received on said main drive shaft, means to transmit rotation from said quill shaft to said drive shaft, a casing carried by said quill shaft, a bevel gear fixed on said quill shaft in said casing, a transmission shaft mounted in said casing, a bevel gear on the inner end of the transmission shaft in mesh with the first named bevel gear, a motor carried by said casing, means including a flexible belt to drive the transmission shaft from the motor, a shaft parallel to and spaced from said quill shaft, a pulley on one end of last named shaft adapted to drive a fettling roll, and means to drive the last named shaft from the transmission shaft.

3. In a cotton card engine or the like having a main drive shaft, a drive unit for said card engine comprising, a quill shaft received on said main drive shaft, means to transmit rotation from said quill shaft to said drive shaft, a casing carried by said quill shaft, a bevel gear fixed on said quill shaft in said casing, a transmission shaft mounted in said casing, a bevel gear on the inner end of the transmission shaft in mesh with the first named bevel gear, a motor carried by said casing, means including a flexible belt to drive the transmission shaft from the motor, a shaft parallel to and spaced from said quill shaft, a pulley on one end of said last named shaft adapted to drive a fettling roll, and means including a pair of 45° spiral gears to drive the last named shaft from the transmission shaft.

4. In a cotton card engine or the like having a main drive shaft, a drive unit for said card engine comprising, a quill shaft received on said main drive shaft, means to transmit rotation from said quill shaft to said drive shaft, a casing carried by said quill shaft, a bevel gear fixed on said quill shaft in said casing, a transmission shaft mounted in said casing, a bevel gear on the inner end of the transmission shaft in mesh with the first named bevel gear, a motor carried by said casing, means including a flexible belt to drive the transmission shaft from the motor, means to adjust the angular position of the motor on the casing to vary the speed of the quill shaft,

and means to secure said casing against rotation about the main drive shaft.

5. In a cotton card engine or the like having a main drive shaft, a drive unit for said card engine comprising, a quill shaft received on said main drive shaft, means to transmit rotation from said quill shaft to said drive shaft, a casing carried by said quill shaft, a bevel gear fixed on said quill shaft in said casing, a transmission shaft mounted in said casing, a bevel gear on the inner end of the transmission shaft in mesh with the first named bevel gear, a motor carried by said casing, means including a flexible belt to drive the transmission shaft from the motor, a shaft parallel to and spaced from said quill shaft, a pulley on one end of said last named shaft adapted to drive a fettling roll, means to drive the last named shaft from the transmission shaft, and means to secure said casing against rotation about the main drive shaft.

6. In a cotton card engine or the like having a main drive shaft, a drive unit for said card engine comprising, a quill shaft received on said main drive shaft, means to transmit rotation from said quill shaft to said drive shaft, a casing carried by said quill shaft, a bevel gear fixed on said quill shaft in said casing, a transmission shaft mounted in said casing, a bevel gear on the inner end of the transmission shaft in mesh with the first named bevel gear, a motor carried by said casing, means including a flexible belt to drive the transmission shaft from the motor, a shaft parallel to and spaced from said quill shaft, a pulley on one end of said last named shaft adapted

to drive a fettling roll, means including a pair of 45° spiral gears to drive the last named shaft from the transmission shaft, and means to secure said casing against rotation about the main drive shaft.

7. In a cotton card engine, or the like, having a main drive shaft, a drive unit for said engine comprising, a quill shaft received on the main drive shaft and supported thereby, means to transmit rotation from the quill shaft to the drive shaft, a casing carried by said quill shaft, a bevel gear fixed on said quill shaft within said casing, a transmission shaft mounted in said casing, a bevel gear on the inner end of the transmission shaft in mesh with the first named bevel gear, a motor carried by said casing, a variable V-belt drive operatively connected between the motor and the transmission shaft to turn the latter, and means to vary the position of the motor to vary the driving ratio between the motor and the transmission shaft.

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