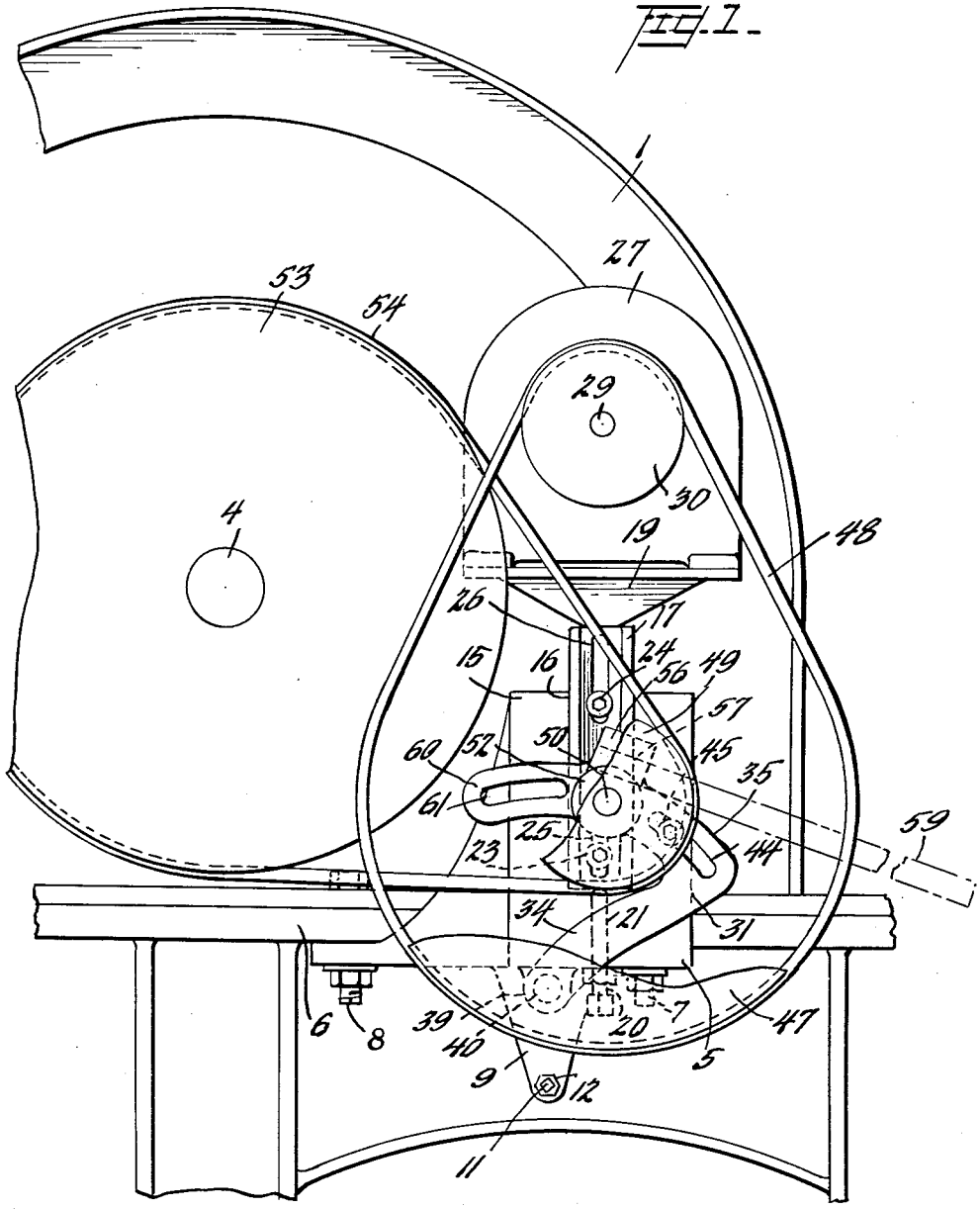
Jan. 9, 1962 W. A. WILLIAMS ET AL 3,015,965

CLUTCH-FREE TEXTILE CARDING MACHINE

Original Filed Oct. 1, 1956 2 Sheets-Sheet 1

FIG. 1.



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FIG. 2.

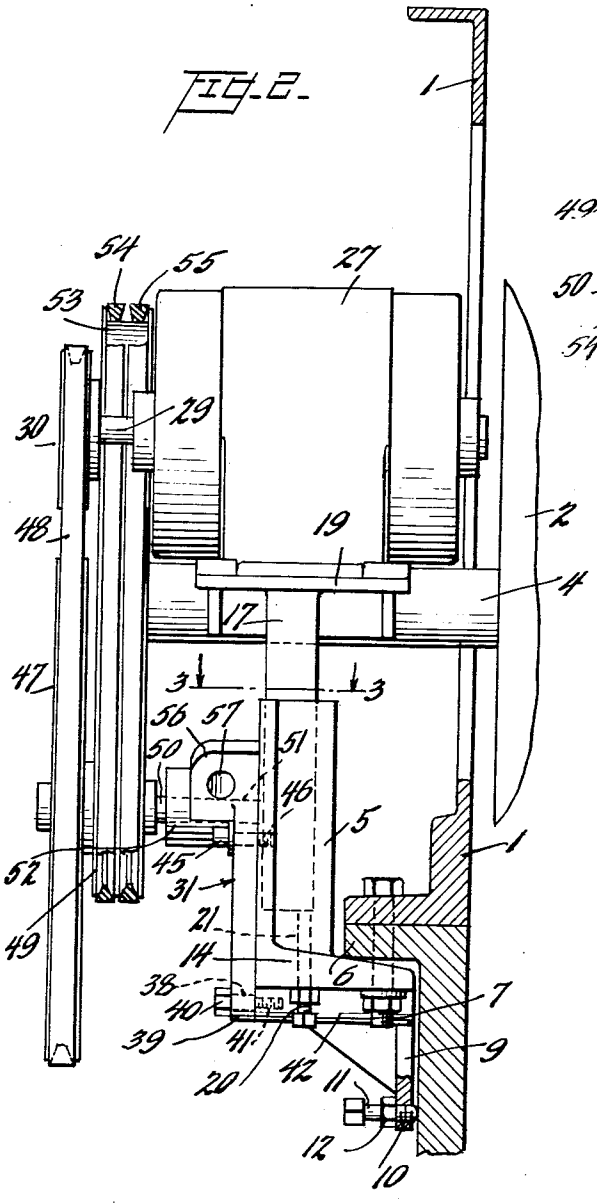


FIG. 3.

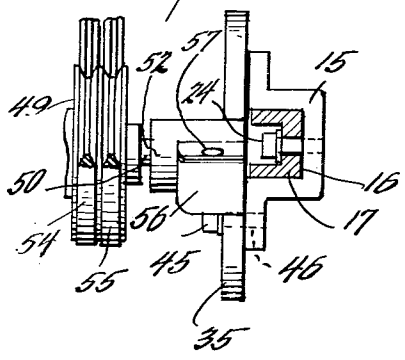
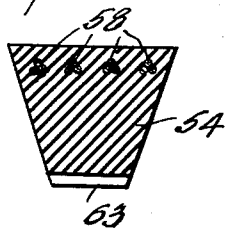


FIG. 4.



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CLUTCH-FREE TEXTILE CARDING MACHINE

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Continuation of application Ser. No. 613,325, Oct. 1, 1956. This application Apr. 1, 1959, Ser. No. 803,544

9 Claims. (Cl. 74—242.12)

This application is a continuation of our application Ser. No. 613,325, now abandoned, filed October 1, 1956, for Clutch-free Textile Carding Machines.

This invention relates to drives for textile carding machines and has for an object to provide a drive mechanism of extremely simple character compared with previously known drives for such machines.

The problem of driving textile carding machines from electric motors is complicated by a number of factors which must be taken into consideration. Among these are that the main cylinder of a carding machine must turn at a comparatively low speed relative to the speed at which electric motors are adapted to run efficiently thus requiring a considerable reduction in driving ratio between the motor and the carding machine cylinder. A further problem involved is that the carding machine must sometimes be stopped for repairs and reconditioning, and since its moving parts are of very substantial mass the inertia encountered in starting up the machine is also very substantial and it has heretofore been considered necessary to provide a clutch between the motor and the driven carding machine in order to allow the electric motor to come up to its normal operating speed in a short length of time, say a few seconds. The clutch would be gradually engaged to bring the carding machine slowly up to its operating speed and thus distribute the work required to overcome the said inertia over a longer period of motor operation. Without such clutch it was considered that the electric motor would be overheated and damaged, or else a motor would have to be provided of such high power as to be impractical and too expensive, considering the relative low power required for maintaining the carding machine in operation after starting.

According to the present invention this problem is solved in a most expeditious manner by using an electric motor of a size approximating that which would be required if a clutch were provided, while providing a drive in which the clutch is eliminated with resulting simplification and reduction of cost.

An object of this invention is to provide a carding machine drive comprised entirely by belt and wheel arrangements and in which one of the drive arrangements, the engagement between the belt and driving member, is stronger than the drive between the driven pulley wheel, and the adjustment of tension in said belt can be made such that during the starting of the machine the said belt is enabled to slip relative to said driven pulley wheel so that the electric motor can quickly come up to its normal operating speed while the gain in speed of the carding machine lags and thus distributes the starting load over a longer period of motor operation.

A further object of this invention is to provide a drive of the kind indicated in which the driven pulley on which the belt is adapted to slip is comparatively wide and preferably of substantial mass in order to distribute the friction between the belt and pulley and aid in dissipating heat generated by the slipping friction.

Still another object of this invention is to provide a drive of the above described type in which the belt, which slips on the driven pulley, is of a type having no appreciable stretch so as to maintain a substantially constant application of torque to the carding machine drive shaft during the starting operation.

In the accompanying drawings illustrating an embodiment of this invention,

FIGURE 1 is an elevational view of the drive attached to an end of a carding machine frame, the latter being illustrated only diagrammatically.

FIGURE 2 is a side view of the drive attached to a carding machine frame.

FIGURE 3 is a sectional view on line III—III of FIG. 2.

FIGURE 4 is a cross sectional view of a driving belt showing wire cables embedded thereon to prevent stretching.

In the accompanying drawings numeral 1 indicates the frame of a textile carding machine in which is mounted a cylinder 2, one end port of which is shown. A drive shaft 4 extends outwardly from said cylinder and serves for driving the carding machine. Inasmuch as the details of the carding machine are not involved in the present invention the carding machine is represented only diagrammatically in the present drawings.

According to the present invention a main motor bracket 5 is secured to a horizontally extending flange 6 of the carding machine frame 1 by bolts 7 and 8. For providing additional support for said bracket and making minor adjustments and maintaining the bracket level, the bracket is provided with a downwardly extending arm 9, which toward its lower end is provided with a screw-threaded bore 10, through which passes adjusting bolt 11, having lock nut 12, screw-threadedly mounted thereon.

Motor bracket 5 is formed with a flat horizontally extending platform 14 which toward its outer edge is provided with an upwardly extending plate-like arm 15 formed with a vertically extending guideway 16 recess in its outwardly facing face. In this guideway 16 is adjustably mounted a motor-supporting standard 17 which depends from a motor base 19 of any suitable form. The adjustability of standard 17 in guideway 16 is provided by an adjusting screw 20 which screw-threadedly engages in a vertically extending screw-threaded bore 21 in the platform portion 14 of the motor bracket at a location beneath the lower end of standard 17. The height of motor supporting base 19 is adjusted by turning screw 20. For securing standard 17 in adjusted position a pair of studs 23 and 24 are provided which engage in screw threaded bores in the inner face of guideway 16, and serve to clamp the standard 17 in adjusted position against said inner face of the guideway. For permitting adjustment of the standard it is provided with a pair of vertically extending slots 25 and 26, through which the studs 23 and 24 extend, respectively.

The driving power for the carding machine is provided by an electric motor 27 of ordinary construction but preferably a comparatively slow speed motor of say, 1200 r.p.m. rather than the more common speed of 1800 r.p.m. The motor 27 is mounted on motor base 19 in any suitable manner and in such position that the motor drive shaft 29 extends outwardly from the motor on the side opposite the carding machine. On the outer portion of motor drive shaft 29 is secured a sheave 30 of comparatively small diameter and provided with a V-shaped groove for use with a V-belt.

For transmitting the drive from sheave 30 to the carding machine drive shaft 4 a set of power transmission elements is provided which will now be described and it is to be noted that the principal novelty of the present invention resides in combinative relationships and arrangements of this set of elements.

On the side of motor bracket 5 opposite the carding machine is mounted an idler bracket 31. This idler bracket is formed as a pair of arms 34 and 35 disposed at an angle to each other and one of which, 34, is provided

with a bore 38 in its free end portion 39. Through this bore extends a stud 40 which screws into screw-threaded bore 41 in the lower portion 42 of motor bracket 5.

The other arm 35 of idler bracket 31 is of generally curved form having as its center of curvature the bore 38 in the free end portion 39 of arm 34. Arm 35 is provided with a curved slot 44 also having its center of curvature at the axis of bore 38. Idler bracket 31 is swingable, for adjustment purposes, about stud 40 and is secured in adjusted position by stud 45 which extends through slot 44 in arm 35, and screw-threaded bore 46 in the face of upstanding portion 15 of motor bracket 5.

Idler bracket 31 has for its principal purpose to mount, adjustably, idler V-sheaves 47 and 49. For this purpose a shaft 50 is fixedly mounted in a bore 51 in boss 52 extending outwardly from the face of arm 35 of bracket 31 opposite the carding machine. Sheave 47 is mounted in alignment with sheave 30 on motor driven shaft 29. Sheave 47 is preferably considerably larger in diameter than sheave 30 so that the drive transmitted from sheave 30 to sheave 47 by V-belt 48 is of considerably reduced speed. Sheave 49 may be integral with sheave 47 so as to be turned thereby, and is considerably smaller in diameter than sheave 47.

The drive is next transmitted from V-sheave 49 to flat pulley 53 fixedly mounted on drive shaft 4 of the carding machine 1. As illustrated sheave 49 is of the V type and preferably is provided with more than one V-shaped groove so that it is adapted to exert a very strong and secure drive without slipping. On the contrary pulley 53 has a flat outer face, that is to say, is cylindrical and not provided with grooves for cooperation with V-belts. Pulley 53 is driven from sheave 49 by one or more V-belts, illustrated herein as being two in number, and designated 54 and 55. Preferably these belts are of a type which have substantially no stretch or elongation under load. A preferred type is the wire cable type, that is, the type which contains a plurality of continuous wire cables 58 embedded therein which are incapable of appreciable stretching. In order to render such belts more flexible they are usually provided with transversally extending grooves 63 in their inner faces.

For adjusting the present drive for operation and especially for the starting of the carding machine, the idler bracket arm 35 is provided with lug 56 having a bore 57 formed therein. A lever 59 is adapted to have one end inserted in bore 57 and can be manipulated to swing idler bracket 31 about its pivot stud 40 when locking stud 45 is loosened, to apply a desired tension to belts, 54 and 55. This tension should be made such that during normal driving of the carding machine the drive between sheave 49 and pulley 53 will be free of appreciable slip, but the said tension should be adjusted so that when the carding machine is started the drive of belts 54 and 55 against the flat surface of pulley 53 will be permitted to slip to a sufficient extent to allow the motor 27 to come up to its normal speed to say 1200 r.p.m. within a very few seconds while the speed of the carding machine may lag behind and may not come up to its normal operating speed for a considerably longer period of time. In order to minimize wear and heating of the belts 51 and 52 during this slipping, during the starting-up periods, the pulley 53 is made comparatively heavy or massive so as to be able to absorb considerable heat, and is made comparatively wide so as to spread the friction and heat over either a comparatively wide drive belt, or as illustrated herein, over two or possibly more belts.

In the embodiment of the invention illustrated in the accompanying drawings the curved arm 35 of idler bracket 31 is extended to the left, as viewed in FIG. 1, beyond the lug 56, as indicated at 60 and this extending portion is provided with an additional curved slot 61 having its center of curvature at pivot stud 40. This extending portion 60 and slot 61 serve no useful purpose in the embodiment illustrated but would be useful in connection with different models of carding machines, or in case it were advisable to use belts 54 and 55 of greater length than that illustrated in the present drawings.

We claim:

1. A drive for a textile carding machine comprising a main bracket fixed on the carding machine, a motor supporting base, a motor mounted on said base and having a drive wheel, means for adjusting said motor base relative to said main bracket, an idler bracket mounted on said main bracket, an idler wheel rotatably mounted on said idler bracket, a primary belt drive from said motor drive wheel to said idler wheel, a carding machine drive wheel, a secondary belt drive between said idler wheel and said carding machine drive wheel, said idler wheel having drive surfaces engaged by the belts of both said primary and secondary drives, respectively, the driving engagement between the secondary belt and the carding machine drive wheel being less strong than that between said secondary belt and the idler wheel, so as to allow slippage between said secondary belt and the carding machine drive wheel during starting of the carding machine, said idler bracket having an elongated arm extending transversely of said secondary drive belt, the mounting of said idler bracket on said main bracket being located toward one end of said arm and said mounting being pivotal, the position of mounting of said idler wheel on said idler bracket being spaced from said idler bracket mounting in a direction extending transversely of said secondary belt drive, releasable means for securing said idler bracket selectively in a multiplicity of positions of angular adjustment about its mounting for adjusting the drive between said secondary drive belt and the idler and carding machine drive wheels independently of said motor base adjustment means.

2. A textile carding machine drive, according to claim 1, and in which the wheels engaged by said primary drive belt are sheaves having V-shaped grooves and said primary drive belt is a V-shaped belt.

3. A textile carding machine drive according to claim 1, and in which the idler wheel driving said secondary drive belt is a sheave having a V-shaped groove therein, and carding machine driving wheel having a cylindrical driving face, and said secondary drive belt being V-shaped and having a flat inner face, and engages with its inclined side walls in the groove of said driving sheave and with its inner face against said cylindrical driving surface of said machine drive wheel so as to allow slippage between said secondary drive belt and said pulley during starting of said carding machine.

4. A carding machine drive according to claim 1, and in which said adjusting means for said motor base comprises vertically disposed guide means, a side engaging said guide means, and means for moving said guide means and slide vertically relative to each other for adjusting the tension in the primary drive belt.

5. A drive for a textile carding machine according to claim 4, and in which said guide means is provided with a locking means for locking it in adjusted position.

6. A drive for a textile carding machine according to claim 1, and in which said idler bracket is provided with a removable lever for adjusting the angular position of said idler bracket.

7. A drive for a textile carding machine according to claim 1, and in which the carding machine has a frame and means is provided for securing said drive on said frame.

8. A drive for a textile carding machine comprising a main bracket fixed on the carding machine, a motor supporting base, a motor mounted on said base and having a drive wheel, means for adjusting said motor base relative to said main bracket, an idler bracket mounted on said main bracket, an idler wheel rotatably mounted on said idler bracket, a primary belt drive from said motor drive wheel to said idler wheel, a carding machine drive wheel located laterally of said motor drive wheel and of said

idler wheel, a secondary belt drive between said idler wheel and said carding machine drive wheel and extending transversely of said primary belt drive, said idler wheel having drive surfaces engaged by the belts of both said primary and secondary drives, respectively, the driving engagement between the secondary belt and the carding machine drive wheel being less strong than that between said secondary belt and the idler wheel so as to allow slippage between said secondary belt and the carding machine drive wheel during starting of the carding machine, means for adjusting said idler bracket in the direction of extent of said secondary belt, for adjusting the drive between said secondary belt and the idler and carding machine drive wheels independently of said motor base adjustment means, releasable means for securing said idler bracket selectively in a multiplicity of positions of such adjustment.

9. A textile carding machine drive according to claim 8, and in which the idler wheel driving said secondary drive belt is a sheave having a V-shaped groove therein, and carding machine driving wheel having a cylindrical driving face, and said secondary drive belt being V-shaped and having a flat inner face, and engages with its inclined side walls in the groove of said driving sheave and with its inner face against said cylindrical driving surface of said machine drive wheel so as to allow slippage between said secondary drive belt and said pulley during starting of said carding machine.

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