A. H. DE VOE.

POWER TRANSMITTER.

APPLICATION FILED APR. 1, 1918.

1,401,967.

Patented Jan. 3, 1922.

4 SHEETS—SHEET 1.

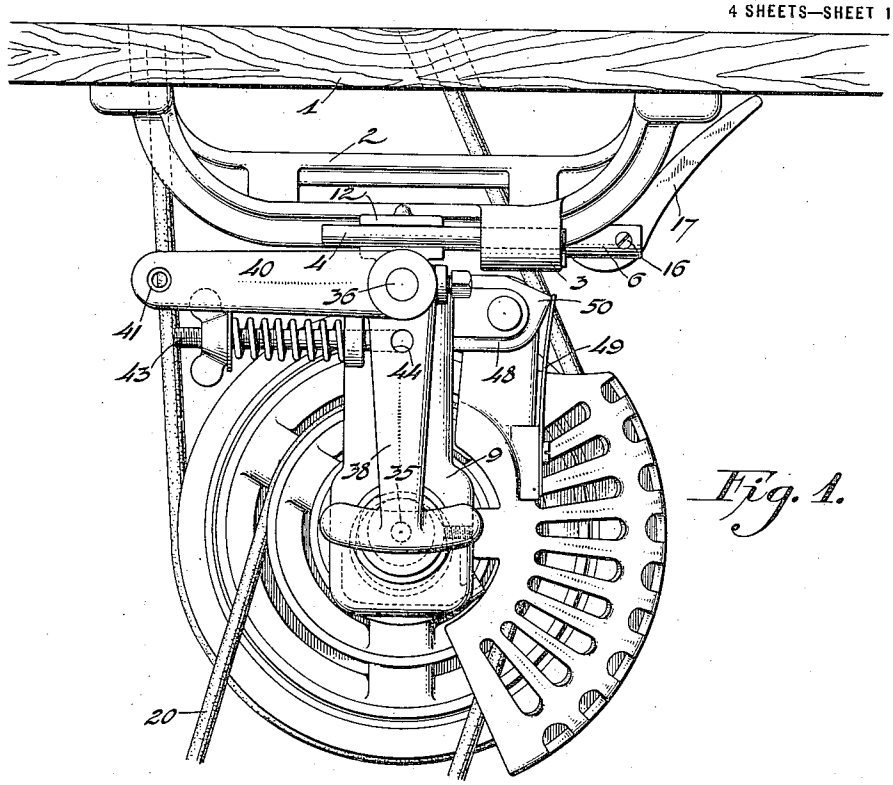


Fig. 1.

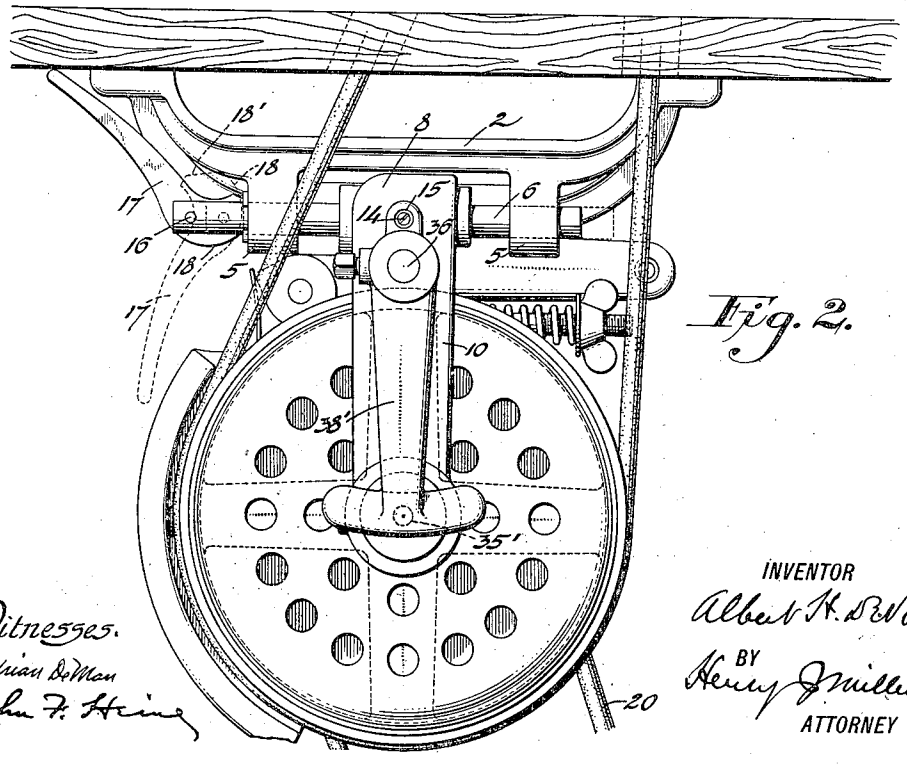


Fig. 2.

Witnesses.

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4 SHEETS—SHEET 2.

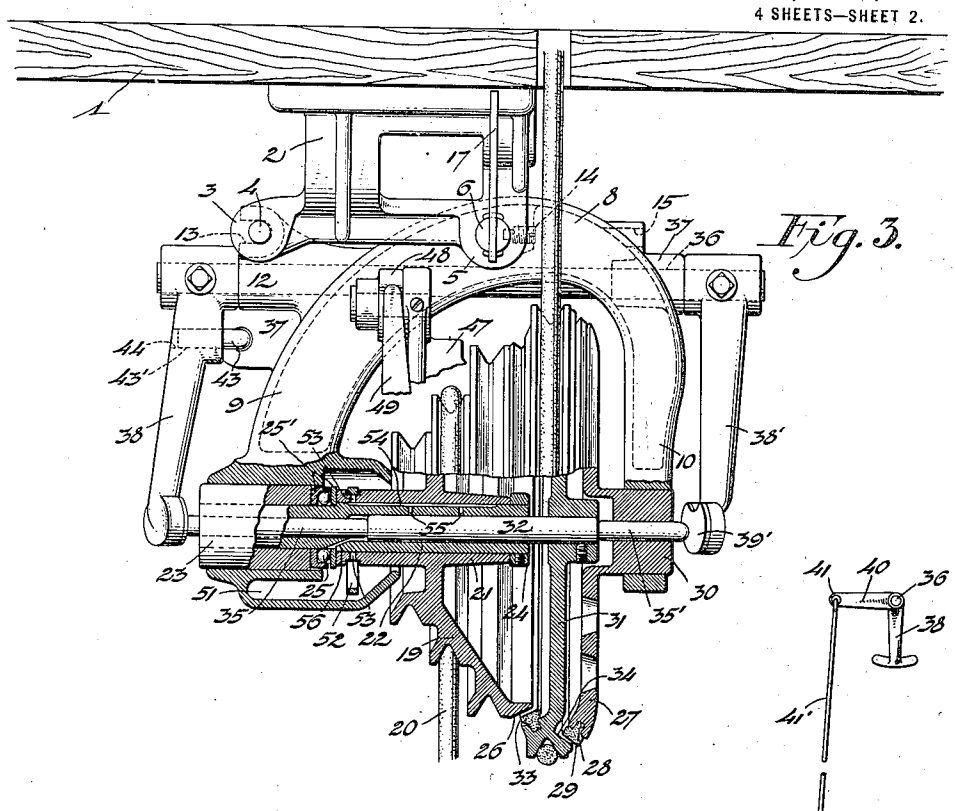


Fig. 3.

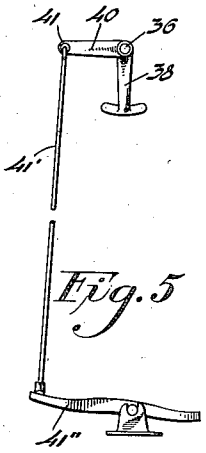


Fig. 5

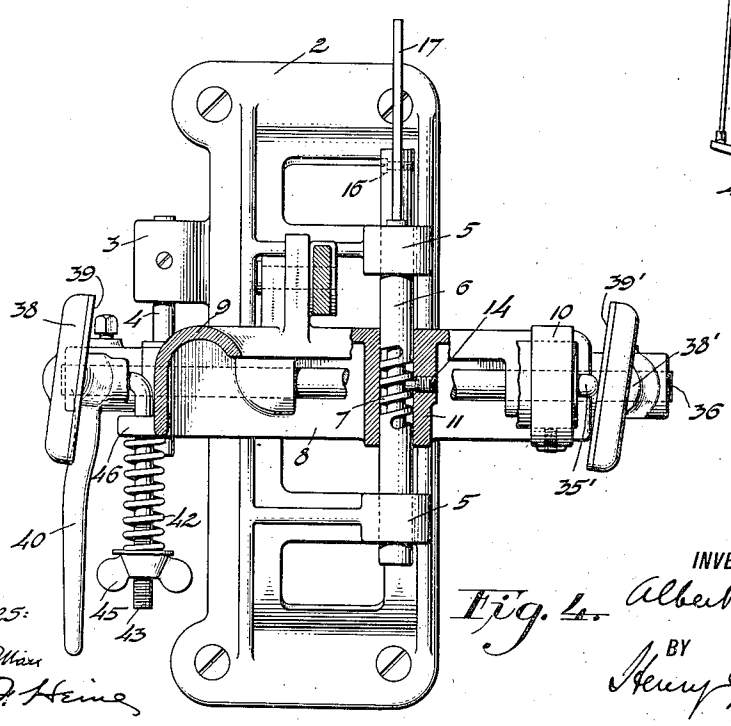


Fig. 4.

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4 SHEETS—SHEET 3.

Fig. 6.

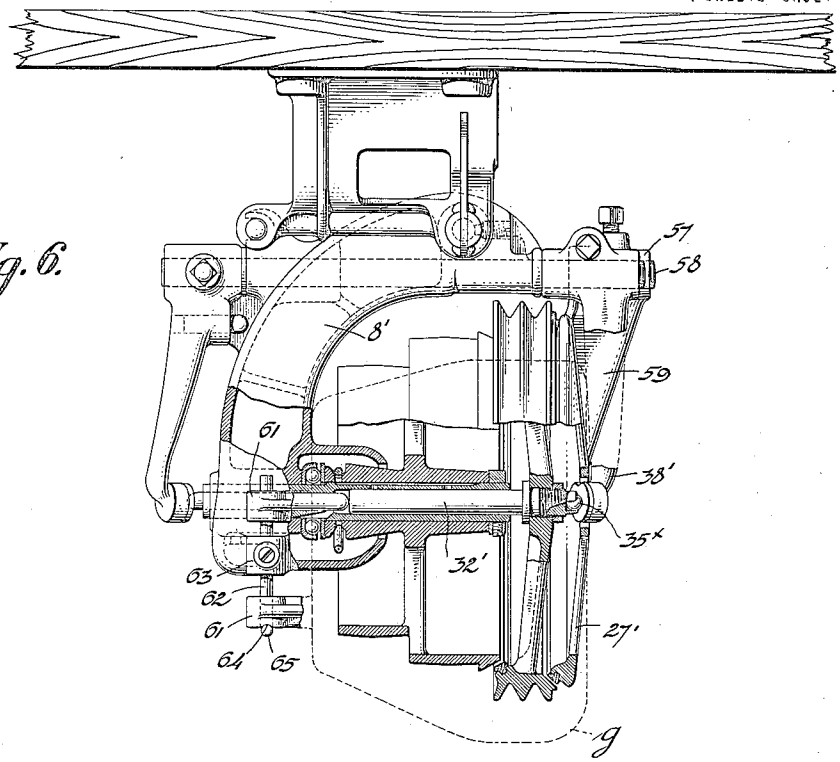
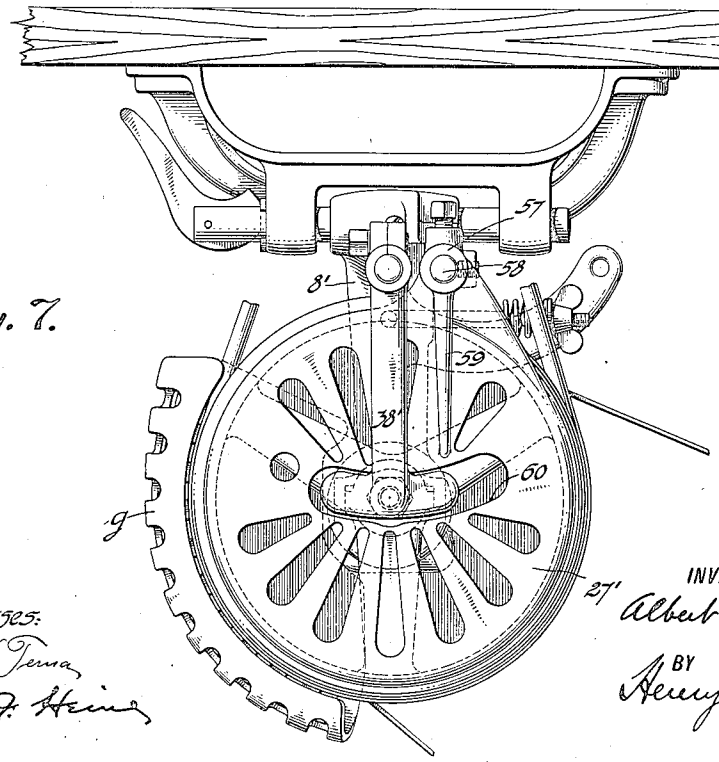


Fig. 7.



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POWER TRANSMITTER.

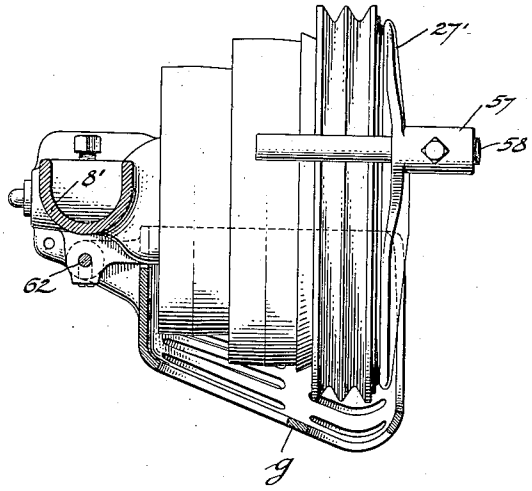
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4 SHEETS—SHEET 4.

Fig. 8.



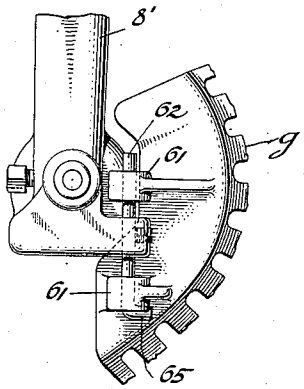


Fig. 9.

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UNITED STATES PATENT OFFICE.

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POWER TRANSMITTER.

1,401,967. Specification of Letters Patent. Patented Jan. 3, 1922.

Application filed April 1, 1918. Serial No. 225,935.

To all whom it may concern:

Be it known that I, ALBERT H. DE VOE, a citizen of the United States, residing at Westfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Power Transmitters, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to power-transmitting devices of the friction clutch-and-brake type represented in my Patent No. 1,163,980, of December 14, 1915, and intended primarily for use in connection with power-driven sewing machines.

Sewing machines, as used in garment factories, are commonly supported in rows upon long power-tables beneath which suitable line-shafting extends; a series of treadle-controlled power-transmitters being suspended from the under sides of the tables and belted up to the line-shafting and to the sewing machines which they are intended to control. As is well known, these power-transmitters usually include a constantly running or driving member, which is belted to the line-shaft, and an intermittently running or driven member which is belted to the sewing machine. The operator, by depressing a treadle, effects a frictional engagement of the driving and driven members, thereby starting the machine. When the pressure upon the treadle is removed the driving connection is broken and the machine is brought to rest.

The present invention has for an object to provide an improved power-transmitter having quick starting and stopping characteristics particularly useful in connection with the control of high-speed sewing machines.

Another object of the invention is to construct a compact and efficient power-transmitter in which frictional losses are reduced to a minimum.

Still further, the invention has for an object to provide a power-transmitter which will run for long periods of time without attention on the part of the operator.

Further objects of the device will appear from the following description and claims.

The present power-transmitter, in its preferred embodiment, comprises a constantly running or driving pulley and a fixed brake-disk between which is journaled a driven pulley, the latter being shiftable axially into engagement with either the driving pulley or brake-disk to start or stop the machine belted thereto. The driven pulley is fixed to a stub-shaft which is journaled within a tubular stud upon which the driving pulley is journaled in fixed running position. A pair of cam-faced arms control a pair of thrust-pins arranged at opposite ends of the shaft carrying the driven pulley to shift said shaft endwise; said cam-arms being so constructed and arranged that one of them recedes just sufficiently to accommodate the movement of its follower thrust-pin occasioned by the other cam-faced arm at the opposite side of the driven pulley. The two cam-arms thus act in a positive manner to control the position of the driven member between the driving and brake members.

The transmitter proper is adjustably supported from a suitable bracket by means of a pair of parallel slide-rods one of which is fixed to the bracket and the other and longer of which is slidably supported by the bracket and passes through an aperture in the transmitter frame or hanger. The longer slide-pin is formed with a screw-thread which is engaged by a follower-pin fixed to the transmitter frame. A cam-lever is pivoted to one end of the longer slide-pin and may be used as a handle to rotate the slide-pin and effect an adjustment of the tension on the driving belt. By tripping the cam-lever, an endwise movement of the slide-pin relative to the hanger is permitted, thus loosening the belt. The normal tension on the belt may be quickly restored by resetting the cam-lever without altering the adjustment of the slide-pin relatively to the transmitter-frame.

The transmitter-frame is provided with an oil-well from which the lubricant is carried by an oil-ring to a series of radial holes passing through the hub of the driving pulley. The oil then flows along the external bearing in an oil-channel at the upper side of the tubular stud and passes downwardly through oil-holes to lubricate the internal bearing between the tubular shaft and the solid stub-shaft carrying the driven pulley. The oil then flows downwardly from the internal bearing through an inclined port to a ball-thrust bearing which sustains the end-thrust of the driven member when it is

forcibly pressed into engagement with the driving member to start the machine. From the ball-bearing the oil flows back into the oil-well.

The invention includes other constructive features to be hereinafter described and pointed out in the appended claims.

In the accompanying drawings Figs. 1 and 2 are left and right side elevations, respectively, of the improved power-transmitter. Fig. 3 is a front view of the device, partly in section. Fig. 4 is a bottom plan view with the pulleys removed and one arm of the transmitter frame broken away. Fig. 5 is a view showing on a small scale the treadle-mechanism for controlling the operation of the transmitter. Fig. 6 is a front view partly in section, of a modified form of the invention. Fig. 7 is a right-side elevation of the same and Figs. 8 and 9 are details showing how the dress-guard of the modification is mounted.

In the embodiment of the invention chosen for illustration in Figs. 1 to 5, inclusive, 1 represents a table-top or other suitable support to which is secured the bracket 2 formed at one side with a lug 3 in which is fixed a horizontal rod or pin 4. Slidably mounted in the apertured lugs 5, 5 at the other side of the frame 2 is a cylindrical rod 6 which is parallel to the rod 4 and is formed between its ends with a screw-thread 7.

The transmitter hanger or frame is in the form of a yoke 8 including depending arms 9 and 10 of channel formation. The yoke 8 is formed with an apertured boss 11 surrounding the threaded portion of the slide-rod 6 and with a laterally projecting lug 12 formed with a channel-way 13 embracing the supporting rod 4. By virtue of this construction the yoke 8 may be shifted bodily relatively to the bracket 2 along the parallel rods 4 and 6.

Projecting through the wall of the boss 11 into engagement with the screw-thread 7 is the inner end of a follower-screw 14, threaded into the boss 11 and accessible through the aperture 15, Fig. 2, in the yoke 8. Pivoted within the bifurcated extremity of the slide-rod 6 upon the screw-pin 16 is a cam-lever 17 adapted to be used as a handle to turn the slide-rod 6 and effect a relative adjustment between said slide-rod and the yoke 8. The cam-lever 17 is flattened at 18′ in the higher portion of its operative edge 18 for a purpose to be described.

The driving pulley 19 of the transmitter, which is connected by means of a belt 20 with the usual constantly running line-shaft, not shown, is formed with a tubular hub 21 which is journaled externally of a tubular stud-pin 22 free at one end and at its opposite end fixed within the bushing 23 which is secured within the apertured lower extremity of the yoke-arm 9. The hub 21 of the constantly running driving pulley is confined to turn in a fixed operative position axially of the stud-pin 22 by means of the collar 24 and the ball-thrust bearing 25, as shown in Fig. 3. The driving pulley is formed with an annular friction driving surface 26. The ball-thrust bearing comprises two spaced rings 25′ having thrust-sustaining surfaces disposed in parallel planes transversely of the axis of the stud 22 and a series of balls between said surfaces.

Mounted in spaced relation with the driving pulley 19 is a friction ring or brake disk 27 having a peripheral groove 28 within which is secured a leather friction ring 29 of large diameter; the disk 27 being formed with a hub 30 which is fixed within the apertured lower extremity of the yoke-arm 10.

The driven pulley 31, which in practice is belted to the machine to be driven, is fixed to a stub-shaft 32 journaled internally of the tubular stud 22 and carries a leather friction ring 33 complementary to the driving surface 26. The driven pulley 31 is also formed with a friction surface 34 complementary to the similar surface on the brake-ring 29. Disposed in end-to-end relation with the stub-shaft 32 are the push-pins 35, 35′ which serve to shift the driven pulley into engagement with either the driving pulley or brake disk.

In transmitters of the present type it is customary to provide treadle-controlled mechanism for establishing an interrupted driving relation between the driving and driven pulleys. In the present instance, the treadle mechanism is of an improved form and comprises a rock-shaft 36 journaled in the bearing-lugs 12 and 37 on the hanger-frame 8 and supporting the downwardly extending arms 38, 38′ formed at their lower extremities with cam-surfaces 39, 39′ which are substantially parallel with each other but are inclined to the axial line of the stub-shaft 32 as shown in Figs. 3 and 4.

Formed integrally with the cam-arm 38 is a treadle-arm 40, the two forming a bell-crank-lever. The arm 40 has an apertured end 41 to which the usual treadle-rod 41′ leading to the treadle-plate 41″ is attached. A downward pull upon the treadle-arm 40 will rock the shaft 36 and cause the cam-faced arm 38′ to shift the push-pin 35′ inwardly, thus pressing the driven pulley forcibly against the driving pulley and effecting the quick starting of the machine to which the transmitter is belted. When the pressure upon the treadle is relieved, the rock-shaft 36 is turned in the opposite direction through the action of the coil-spring 42 surrounding the threaded rod 43 the bent inner end 43′ of which enters an aperture 44 in the cam-faced arm 38. The spring

42 reacts against the adjusting wing-nut 45 on the rod 43 and the ear 46 on the yoke 8, thus effecting a shifting of the driven pulley away from the driving pulley and into engagement with the brake-disk which, being of large diameter, quickly brings the driven pulley to rest without shock. The wing-nut 45, being readily accessible to the operator affords a convenient means for securing either a light or heavy treadle action as desired. This adjustment can be made with ease by any ordinary sewing machine operator, whereas with many prior transmitters it has been necessary for the operator to call in the services of a special machinist to effect the desired adjustment. It will of course be readily understood that the operator may effect the stopping of the machine independently of the action of the spring 42 by pressing downwardly upon the forward edge of the treadle-plate, thus thrusting the treadle-rod upwardly and forcibly lifting the treadle-arm 40 of the transmitter.

A dress-guard 47 is pivoted to the ear 48 on the yoke 8 and may be swung upwardly to afford access to the driving and driven pulleys. The leaf-spring 49 secured to the guard 47 and bearing against the pointed portion 50 of the ear 48 serves to yieldingly detain the guard 47 in lowered or raised position.

The oiling system comprises an oil-well 51 in the extremity of the hanger-arm 9 from which the lubricant is carried by an oil-ring 52 to a series of radial apertures 53 in the hub 21 of the driving pulley 19. The oil flows along the external bearing through the groove 54 in the upper side of the tubular stud 22. From the external bearing the oil passes downwardly through the oil-hole 55 to the internal bearing in the stud 22. From this bearing the oil flows through the downwardly inclined port 56 to the ball-thrust bearing 25 and then returns to the oil-well. By this simple arrangement the various bearings of the device are plentifully supplied with lubricant which passes in series from bearing to bearing without attention from the operator.

It will be observed that the cam-lever 17 may be swung from full to dotted line position, Fig. 2, to quickly loosen the belt 20 when the machine is not to be used for a time. When operations are to be resumed the cam-lever is restored to full line position, thus restoring the original degree of belt-tension previously determined by the adjustment of the yoke 8 on the rod 6. The set-screw 14 may, of course, be set up to lock the slide-rod 6 and yoke 8 in their adjusted positions relative to each other.

In the modification of the invention illustrated in Figs. 6 to 9 inclusive, the various constructive features which are substantially the same as those of the first mentioned embodiment of the invention need not be again referred to. In the modification the brake-disk 27′ is formed with an upwardly extending lug 57 which is fixed to a lateral pin 58 projecting from the hanger 8′ corresponding to the yoke 8 of the modification first described. The brake-disk 27′ is formed with a strengthening rib 59 and with an arcuate slot 60 to afford clearance for the cam-faced lever 38′ which in this modification acts on the ball 35× held within a socket at the right hand end of the stub-shaft 32′, Fig. 6.

The dress-guard g of the modification is constructed to swing outwardly horizontally instead of upwardly and is formed with a pair of lateral ears 61 which are apertured to fit the vertical hinge-pin 62 fixed within the apertured lug 63 on the hanger-arm 8′. The lower ear 61 is recessed at 64 to rest upon the horizontally bent lower extremity 65 of the hinge-pin 62 to lock the dress-guard in closed position. By lifting the dress-guard slightly it may be swung to open position to afford access to the driving pulleys. The various other constructive features of the modification are substantially the same as those illustrated in Figs. 1 to 5 inclusive.

It will be observed that by the present arrangement the upwardly extending belt leading from the driven pulley to the sewing machine can be readily slipped over the end of the transmitter for changing the sewing heads or for making repairs thereto. The present device, by virtue of the use of a tubular stub-shaft, is well adapted to resist bending strains caused by belt-tension. The feature permitting quick loosening and tightening of the belt, without affecting the adjustment determining the degree of tension on the belt when tightened, is of great practical importance in a device of the present character, as it is well known that the life of leather belting may be materially lengthened by relieving it of tension when not in use. When, for any reason, the machine is to remain idle for a time, a quick throw of the cam-lever 17 relieves the tension on the driving belt and also relieves the bearing pressure between the driving pulley 19 and the supporting tubular stud. By restoring the cam-lever 17 to belt-tightening position the flattened portion 18′ of its operative cam edge 18 receives the thrust caused by the belt tension and holds the cam-lever 17 against accidental displacement. The degree of belt tension determined by the adjustment 7, 14 is thus instantly restored.

Having thus set forth the nature of the invention, what I claim herein is—

1. In a power-transmitter, a tubular supporting stud, driving and driven pulleys, one of said pulleys being journaled on the

exterior and the other in the interior of said stud, and duplex cam means cooperating with one of said pulleys at each side and axially thereof for shifting it sidewise to establish and interrupt driving relation between them.

2. In a power-transmitter, a tubular supporting stud, a driving pulley journaled on the exterior of said stud, a driven pulley, a shaft carrying said driven pulley and journaled internally of said stud, and means including a pair of cam-faced levers disposed at opposite ends of said shaft for shifting the latter endwise to establish and interrupt driving relation between said pulleys.

3. In a power-transmitter, a tubular supporting stud, a driving pulley journaled on the exterior of said stud, a driven pulley, a shaft carrying said driven pulley and journaled internally of said stud, a treadle-controlled arm, and means including a pair of cam-faced levers disposed at opposite ends of said shaft for shifting the latter endwise to establish and interrupt driving relation between said pulleys, said cam-faced levers being rigidly connected together and to said treadle-controlled arm.

4. In a power transmitter, a hanger having depending arms, a driving pulley carried by one arm and a brake-disk carried by the other arm, said pulley and disk having annular friction surfaces in spaced parallel relation, a driven pulley having a stub-shaft journaled independently and concentrically of the driving pulley, said driven pulley having friction surfaces complementary to those of said pulley and disk, reciprocable members carried by said arms in engagement with said stub-shaft, and cam means for actuating said members.

5. In a power-transmitter, an apertured hanger arm, a tubular stud free at one end and at its opposite end fixed within the aperture of said hanger-arm, a driving pulley journaled on the exterior of said stud, a stub shaft journaled internally of said stud, a driven pulley rigidly secured to said shaft at the free end of said stud, and manually controlled means cooperating with opposite ends of said shaft for shifting the same endwise.

6. In a power-transmitting device, in combination, a hanger, a tubular bearing stud carried thereby, a driving pulley journaled on the exterior of said stud, a stub-shaft journaled on the interior of said stud, a driven pulley fixed to said stub-shaft, a thrust sustaining ball mounted in the outer end of said stub-shaft, and a cam-faced arm cooperating with said ball to establish driving relations between said pulleys.

7. In a power-transmitter, in combination, a hanger, a tubular stud carried by said hanger, a driving pulley formed with a hub journaled on said stud, a collar and ball-thrust bearing on said stud at opposite ends of said hub, said ball-thrust bearing including thrust walls disposed in parallel planes transverse to the axis of said stud, and a driven pulley having a stub shaft, journaled internally of said stud and adapted to be pressed into engagement with said driving pulley.

8. In a power-transmitter, driving and driven pulleys, and means located at one side of one pulley and the opposite side of the other pulley for relatively shifting them into or out of operative relation, means for connecting said shifting means whereby they may be simultaneously operated, and means for operating said connecting means.

9. In a power-transmitter, driving and driven pulleys having telescopic shafts, and positive means operatively connected to opposite ends of one of said shafts for shifting one of the pulleys toward or from the other, whereby said pulleys are moved into or out of engagement.

10. In a power-transmitter, a driving pulley having a fixed bearing, a driven pulley having a shaft telescopically mounted in said bearing, and means movable transversely to said shaft and coacting with each end thereof for shifting the shaft toward or from said bearing, to thereby bring said pulleys into or out of engagement.

11. In a power-transmitter, driving and driven pulleys, one of said pulleys being shiftable into and out of frictional engagement with the other, oppositely inclined cams arranged on opposite sides of the shiftable pulley, means connecting said cams constantly maintaining them in operative relation to the shiftable pulley, and means for moving said cams to thereby shift said pulley.

12. In a power-transmitter, frictionally engageable driving and driven pulleys, oppositely inclined spaced apart cams, means actuated by said cams for engaging said pulleys or separating them, and means for connecting and moving said cams.

13. A power-transmitter comprising driving and driven pulleys and a brake-disk, means located at opposite sides of the transmitter for shifting said driven pulley into engagement with either the driving pulley or the brake-disk and means for positively operating said shifting means.

14. A power-transmitter comprising driving and driven pulleys and a brake-disk, and means located at opposite sides of the transmitter and movable transversely to the axis of said pulleys for shifting said driven pulley into engagement with either the driving pulley or the brake-disk.

15. In a power-transmitter, a driving pulley having a fixed tubular bearing, a brake-disk, a driven pulley interposed be-

tween the two and having a shaft slidable within said bearing, and opposed cam means for positively shifting said shaft and its pulley toward either the driving pulley or the brake-disk.

16. A power-transmitter comprising a driving pulley, a brake-disk, an interposed driven pulley, a slidable shaft fixedly connected to said driven pulley, a rock-shaft, means for actuating the same, and means interposed between said rock-shaft and the ends of said slidable shaft for positively shifting the latter and its pulley toward either the driving pulley or the brake-disk.

17. In a power transmitter, driving and driven pulleys, one of said pulleys being shiftable into and out of frictional engagement with the other, oppositely inclined cams arranged on opposite sides of the shiftable pulley and simultaneously reciprocable transversely to the axis thereof, means for constantly maintaining said cams in operative relation to said shiftable pulley, and means for actuating said cams.

18. In a power-transmitter, relatively shiftable driving and driven pulleys, an oscillatory shift member having arms extending therefrom, thrust members each moved by a respective arm for effecting the relative shifting of said pulleys, and means for actuating said shift member.

19. In a power transmitter, relatively shiftable driving and driven members, oppositely disposed spaced thrust members for effecting said shifting, and means for reciprocally actuating said thrust members.

In testimony whereof, I have signed my name to this specification.

ALBERT H. DE VOE.