Nov. 4, 1924. 1,514,083

P. A. HERR

POWER TRANSMITTER

Filed Oct. 31, 1923 3 Sheets-Sheet 1

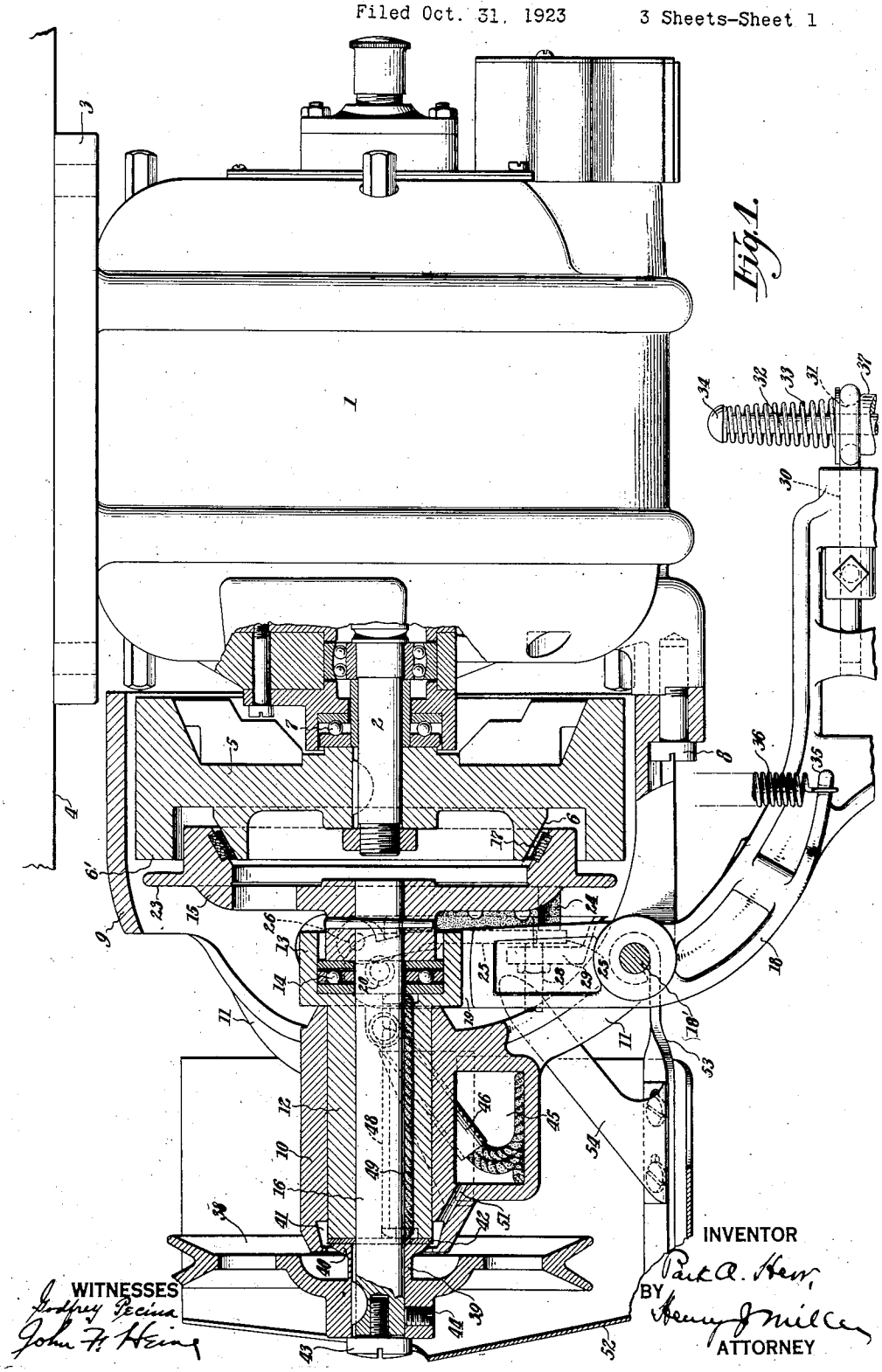


Fig. 1.

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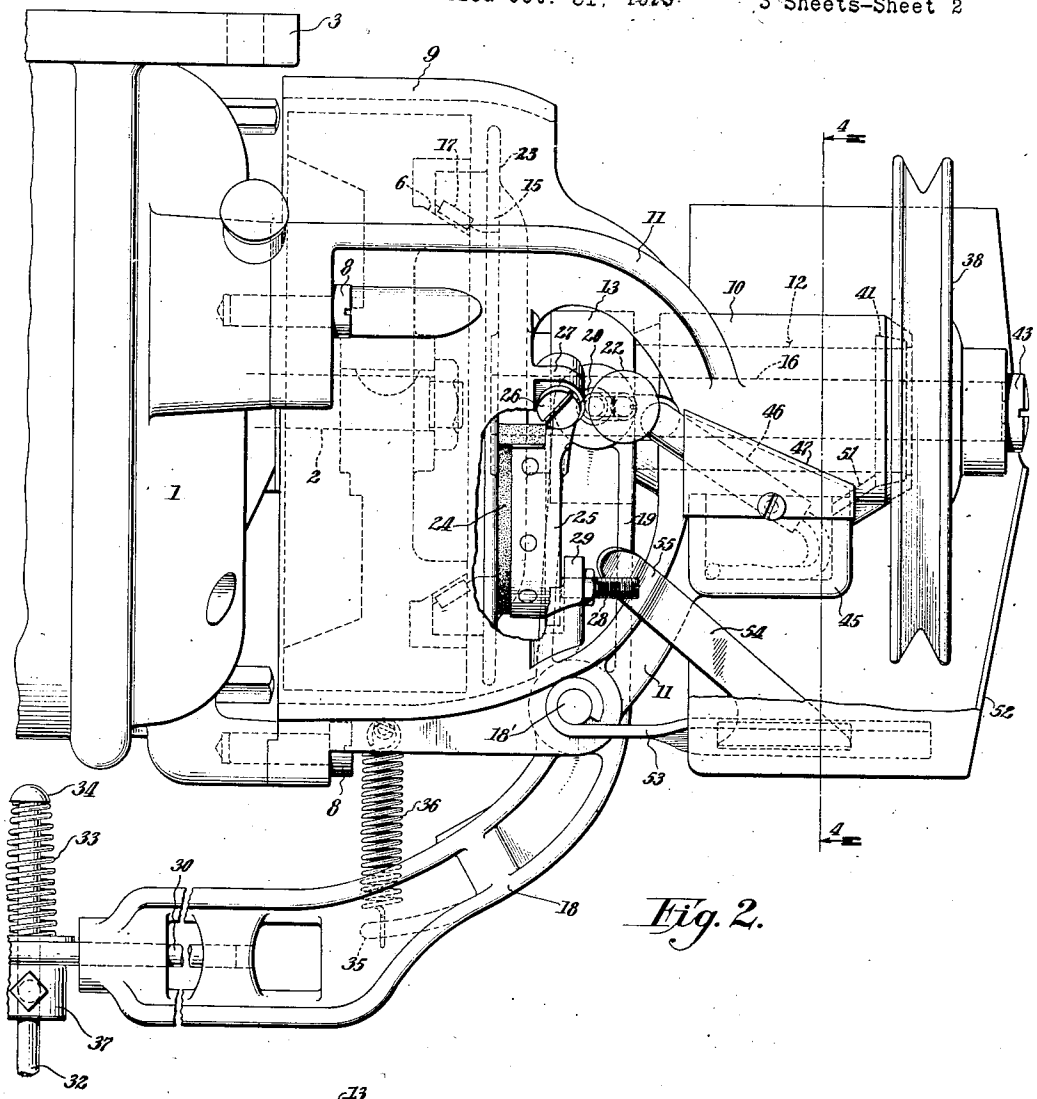


Fig. 2.

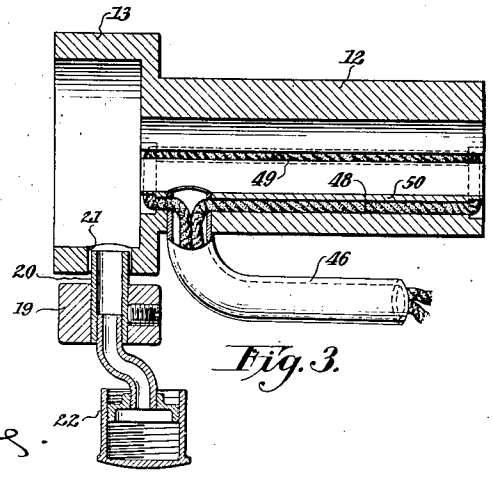


Fig. 3.

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POWER TRANSMITTER

Filed Oct. 31, 1923 3 Sheets-Sheet 3

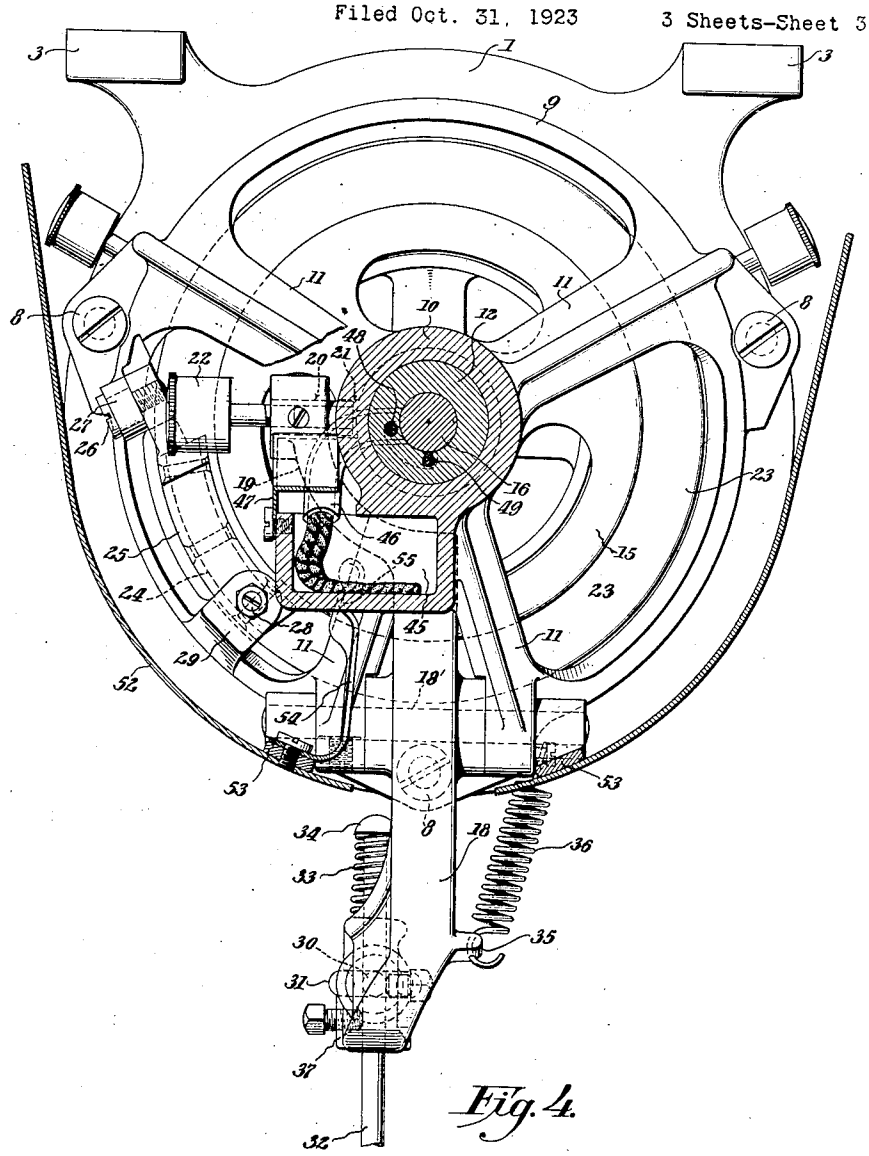


Fig. 4.

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UNITED STATES PATENT OFFICE.

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POWER TRANSMITTER.

Application filed October 31, 1923. Serial No. 671,924.

To all whom it may concern:

Be it known that I, PARK A. HERR, a citizen of the United States, residing at Hillside, 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-transmitter mechanisms and more particularly to unitary motor and power-transmitter mechanisms adapted for use in clothing manufacturing establishments as individual sewing machine drivers; each sewing machine having its own individual transmitter mechanism or motor-and-transmitter unit.

In garment manufacturing establishments it is customary to arrange the sewing machines in rows upon long tables known as "power tables;" each sewing machine being belted to a power-transmitter mounted under the table and connected to a treadle or the like, whereby the operator may start and stop and control the speed of the sewing machine at will. The several power-transmitters may receive their power from a line-shaft running lengthwise of the table, or may each be combined with an individual driving motor.

Being located below the table-top, these power-transmitters are more or less difficult of access and experience has taught that in factory installations the matter of their proper lubrication is more often neglected than not; little thought being given the transmitters as long as they will run. When trouble arises or harsh or noisy running is experienced, the shop mechanic is apt to give the transmitter a liberal application of oil, most of which is promptly thrown off by the rapidly rotating parts and is spread over the floor, the treadle, the operator and the work being operated upon, to the great annoyance of all concerned. Moreover, this treatment usually comes too late, as a certain amount of destructive wear in the transmitter has already occurred, whereby the latter is apt to continue to run noisily and unsatisfactorily.

An object of the present invention is to provide a power-transmitter which will run quietly and efficiently for long periods without attention and which requires an application of lubricant only at infrequent intervals.

Another object of the invention is to provide a power-transmitter which will take care of a liberal supply of lubricant without scattering it over the work and the surroundings in general.

A further object of the invention is to provide a power-transmitter whereby a nice control may be had over the driven machine without excessive lost motion in the controlling mechanism and without any tendency of the transmitter parts to cramp or bind, particularly when a braking effort is being applied.

To the attainment of the ends in view the driven shaft of the transmitter, that is, the shaft carrying the driven clutch-element is journaled in a non-rotating sleeve which, in turn, is journaled to slide endwise in a bearing in the transmitter frame. The driven shaft is forced to move endwise with the sleeve by the use of thrust bearing connections at the opposite ends of the sleeve. The transmitter frame is preferably formed with an oil reservoir and the slidable non-rotating sleeve is provided with means for drawing the oil from the stationary reservoir into the bearing between such sleeve and the driven shaft. The spent oil escaping from the end of the sleeve is preferably caught by an internal groove in the frame bearing member and returned to the reservoir through a suitable duct.

The sleeve may be slid in its bearing by any suitable means such for example as a treadle controlled lever. The driven clutch-element is disposed between a line clutch-element and a brake, so that when the sleeve is moved endwise the driven clutch-element is positively carried into engagement with either the driving element or the braking element. A belt pulley for driving the sewing machine is mounted on the driven shaft preferably at the outer end of the latter.

In the accompanying drawings, Fig. 1 is a side elevation partly in section, of a combined motor and power-transmitter unit embodying the invention. Fig. 2 is a reverse side elevation of the same. Fig. 3 is a longitudinal sectional view of the bearing sleeve for the driven shaft of the transmitter and Fig. 4 is a section on the line 4—4, Fig. 2.

The invention is shown as embodied in a

motor-transmitter unit comprising an electric motor having a frame 1 and power-shaft 2; the frame having feet 3 adapting it to be secured to the under side of a table-top 4. Keyed on the motor-shaft 2 is a driving element in the form of a fly-wheel 5 having a conical male friction driving surface 6 and a weighted rim 6' of greater diameter than and overhanging the driving surface 6. Between the hub of the driving wheel 5 and the motor frame is a ball-thrust bearing 7.

Secured to the motor frame by screws 8 is the transmitter frame formed at one end with a cylindrical guard rim 9 surrounding the driving clutch-element 5. At its other end the transmitter frame is formed with a bearing boss 10 sustained from the rim 9 by the curved webs 11.

Slidably mounted in the bearing boss 10 is the sleeve 12 having at one end a hollow cup-shaped head 13 for a ball-thrust bearing 14 between such head and the hub of the driven clutch-element 15 which latter is pinned to the driven shaft 16 journaled to rotate in the sleeve 12. The driven clutch-element 15 is formed with a female conical surface into which is let the friction leather 17 adapted to mate with the conical driving portion 6 of the wheel 5. Driving relation between the clutch members 5 and 15 is established preferably by means of a treadle-controlled lever 18 pivoted on the pin 18' bridging the space between the two lowermost frame webs 11. The lever 18 is formed at its upper end with a curved off-set arm 19 to which is fixed a hollow pin 20 freely entering an aperture 21 in the head 13. A grease cup 22 is fitted to the hollow pin 20 and serves as a means for supplying lubricant to the thrust-bearing 14.

The driven clutch-element 15 is formed with an annular plane surface 23 which is adapted to be engaged by the stationary brake shoe 24 fitted to an arm 25 hung from a pivot screw 26 passing through a lug 27 on the transmitter frame-portion 9. An adjustable stop-screw 28 threaded through the frame-lug 29 backs up the brake-arm 25 and determines the amount of motion of the driven clutch-member between driving and braking positions. The screw 28 enables the operator to compensate for wear on the driving and braking leathers, 17 and 24, respectively.

The lever 18 has fitted to its free end a rod 30 formed with an eye 31 through which passes the headed upper end of a treadle rod 32. A spring 33 is interposed between the head 34 of the rod 32 and the eye 31 and cushions the downward or clutching force applied by the operator through the rod 32. The lever 18 is formed with a lateral lug 35 which is connected by the spring 36 to a screw 37 threaded into the transmitter frame. The spring 36 will force the driven-element 15 against the brake 24 with a certain predetermined pressure which may be exceeded to any desired extent by the operator in forcing the rod 32 upwardly and causing the collar 37 to lift the arm 18 in conjunction with the spring 32. The pin 20 and arm 18' prevent rotation of the sleeve 12 and serve to move the latter only endwise to carry the driven element 15 into engagement with either the driving or brake elements, 5 and 24, respectively.

The driven-shaft 16 has keyed upon its outer end the belt-pulley 38 from which, in practice, a belt is run to the machine to be driven. This pulley may be formed with an inner reduced hub-portion 39 entering the outer end of the bearing 10 and terminating with an oil throw-off flange 40 within the annular oil-catching groove 41 in the bearing 10.

The inner end of the hub 39 is faced normal to its axis and has interposed between it and the sleeve 12 a bearing washer 42. Threaded into the outer end of the shaft 16 is an adjusting screw 43, the head of which engages the outer end of the hub of the pulley 38 and serves to determine the working clearance between the bearings at the ends of the sleeve 12 and the hubs of the pulley 38 and driven member 15. The adjustment is held by means of the set-screw 44.

The transmitter-frame is formed below the bearing 10 with an oil reservoir 45 cast integral with the transmitter frame and having an open top at one side of the bearing into which extends the bent oil-tube 46 carried by and extending through the wall of the sleeve 12. The open top of the reservoir 45 is fitted with an open ended cover 47.

The sleeve 12 is formed with a longitudinal duct 48 intersecting the tube 46 and with an internal longitudinal groove 49 parallel to and spaced from the duct 48. A strip of wicking is laid in the groove 49 and threaded through the duct 48 and tube 46 so as to dip into the reservoir 45. The duct 48 is separated from the internal bearing surface of the sleeve 12 by a wall 50 of metal, Fig. 3, whereas the groove 49 is cut through the bearing surface to apply the lubricant to the shaft 16. It will be evident that the lubricant is drawn by capillary attraction from the reservoir 45 through the tube 46 and duct 48 to the opposite ends of the sleeve 12 from which it is supplied to the wicking in the groove 49 and is distributed with uniformity throughout the length of the bearing. The spent lubricant is eventually thrown from the flange 40 of the pulley 38 into the groove 41 from which it is returned by gravity through the duct 51 to the reservoir 45. Sufficient lubricant for the bearing between the sleeve 12 and the frame bearing support 10 will be drawn into such bearing by capillarity from the groove 41. Since the sleeve

12 does not rotate this latter bearing requires but little oil.

A guard 52 of sheet metal is preferably placed about the pulley 38 and supported by arms 53 curved around the opposite ends of the pivot pin 18' so as to permit the guard to be swung about such pivot pin. The spring arm 54 secured to the guard is provided with a depression 55 to snap over one of the lower webs 11 of the transmitter frame and hold the guard in raised or operative position.

In accordance with the present improvement the braking effort is applied to the driven element lengthwise of the driven shaft and excessive side thrust on the bearings, when braking, is avoided. Further, there is no tendency for the driven element to stick or become locked to the brake. This feature is particularly desirable where a nice control of the driven machine is a desideratum.

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

1. A power-transmitter having spaced driving and brake elements, a driven element disposed between said driving and brake elements, a supporting frame formed with a bearing, a non-rotating sleeve slidably mounted in said bearing, a shaft journaled in said sleeve and confined to move endwise with the latter, said driven element being carried by said shaft, means for moving said sleeve endwise in opposite directions to carry said driven element into engagement with either the driving element or the brake element, and a belt-pulley mounted on said shaft.

2. A power-transmitter comprising a frame formed with a bearing, a non-rotating sleeve slidably mounted in said bearing, a shaft journaled in said sleeve, a driven clutch-element and a belt-pulley mounted on said shaft at the opposite ends of said sleeve, thrust-bearings between said sleeve and said driven clutch-element and belt-pulley, means for sliding said sleeve in opposite directions, and driving clutch- and brake-elements disposed on opposite sides of said driven clutch element.

3. A power-transmitter comprising a frame formed with a bearing, a non-rotating sleeve slidably mounted in said bearing, a shaft journaled in said sleeve, a driven clutch-element and a belt-pulley mounted on said shaft at the opposite ends of said sleeve, thrust-bearings between said sleeve and said driven clutch-element and belt-pulley, means under the control of the operator for sliding said sleeve in opposite directions, driving clutch- and brake-elements disposed on opposite sides of said driven clutch-element, and means for adjusting one of said thrust-bearings lengthwise of said shaft and relative to said sleeve.

4. A power-transmitter having, in combination, a frame, a non-rotating sleeve mounted to slide endwise in said frame, means for sliding said sleeve, a shaft journaled in said sleeve and confined to move endwise with the latter, a driven clutch-element and belt-pulley on said shaft, and a driving clutch-element opposed to said driven clutch-element.

5. A power-transmitter having, in combination, a frame, a non-rotating sleeve mounted to slide endwise in said frame, means for sliding said sleeve, a shaft journaled in said sleeve and confined to move endwise with the latter, a driven clutch-element and belt-pulley on said shaft, and driving and braking elements on opposite sides of said driven clutch-element.

6. A power-transmitter having, in combination, a frame, a non-rotating sleeve mounted to slide endwise in said frame, said sleeve having at one end an enlarged cupped head, a ball thrust-bearing in said cupped head, a shaft journaled in said sleeve, a driven clutch-element on said shaft adjacent said thrust-bearing, a belt-pulley on said shaft adjacent the other end of said sleeve, a driving clutch-element opposed to said driven clutch-element, and means for sliding said sleeve.

7. A power-transmitter having, in combination, a driving element, a driven element, a shaft carrying said driven element, a sleeve in which said shaft is journaled, means for preventing relative endwise movement between said shaft and sleeve, a bearing bracket in which said sleeve is slidingly mounted, a stationary oil-reservoir carried by said bracket, and means for conducting oil from said reservoir to the inner bearing surface of said sleeve.

8. A driving mechanism comprising, in combination, a motor having a frame and a power-shaft, a transmitter-frame rigidly assembled with the motor-frame and having a bearing in line with said shaft, a non-rotating sleeve slidably mounted in said bearing, a driven shaft journaled in said sleeve and having both its ends extended beyond the latter, a driven clutch member on the driven shaft at the end of said sleeve adjacent the motor, a belt-pulley on the shaft at the other end of said sleeve, said driven clutch-member and belt-pulley confining said shaft to move endwise with said sleeve, a driving clutch-member, and means for sliding said sleeve.

9. A driving mechanism comprising, in combination, a motor having a frame and a power-shaft, a transmitter-frame rigidly assembled with the motor-frame and having a bearing in line with said shaft, a non-rotating sleeve slidably mounted in said bearing, a driven shaft journaled in said sleeve and having both its ends extended beyond the latter, a driven clutch-member on

the driven shaft at the end of said sleeve adjacent the motor, a belt-pulley on the shaft at the other end of said sleeve, said driven clutch-member and belt-pulley confining said shaft to move endwise with said sleeve, a driving clutch-member, means for sliding said sleeve, a stationary oil-reservoir in said transmitter-frame, means for conducting oil from said reservoir to the inner bearing surface of said sleeve, and means at the belt-pulley end of said sleeve for returning spent oil to the oil-reservoir.

10. In a power-transmitter, a driving clutch-element, a driven clutch-element, a shaft carrying said driven clutch-element, a sleeve in which said shaft is journaled for rotation and relative to which said shaft is confined against endwise movement, a bearing bracket in which said sleeve is slidably mounted and confined against rotation, a slot in the inner bearing surface of said sleeve, a lateral conduit secured to said sleeve, an oil-reservoir carried by said bracket, a wick passing from said oil-reservoir through said conduit to and along the slot in said sleeve, and means for sliding said sleeve to establish and interrupt driving relation between the clutch-elements.

11. A driving mechanism comprising a driving clutch-element, a driven clutch-element, a belt-pulley, a shaft carrying at its opposite ends said driven clutch-element and belt-pulley, a bearing bracket for said shaft between said driven clutch-element and belt-pulley, a sleeve slidably mounted in said bearing bracket, said shaft being journaled to rotate in said sleeve and confined to move endwise with the latter, a manually operated lever connected to move said sleeve toward and away from said driving clutch-element, and a stationary brake-element carried by the frame on the side of the driven clutch-element opposite the driving clutch-element.

12. A driving mechanism comprising a motor having a frame and a power-shaft, a driving clutch-element on the motor-shaft, a transmitter frame rigidly associated with the motor-frame and having an oil-reservoir and a bearing in line with said motor-shaft, a non-rotating sleeve slidably mounted in said bearing and fitted with an oil wick extending into said oil-reservoir, a transmitter-shaft journaled in said sleeve and confined to move endwise with the latter, a driven clutch-element carried by said transmitter-shaft adjacent said driving clutch-element, a belt-pulley carried by the opposite end of said shaft, and means for sliding said sleeve.

13. A driving mechanism comprising a driving clutch-element, a driven clutch-element, a shaft carrying said driven clutch-element, a sleeve in which said shaft is journaled, said sleeve having at one end an enlarged and cupped head, a thrust-bearing for said driven element fitted in said head, a frame in which said sleeve is slidably mounted, a treadle-controlled lever fulcrumed on said frame and connected to move said sleeve toward and away from said driving element, a belt-pulley mounted on said shaft adjacent the other end of said sleeve, and a stationary brake adpated to cooperate with said driven element when the latter is shifted away from the driving element.

14. In a power-transmitter, a driving clutch-element, a driven clutch-element, a shaft carrying said driven clutch-element, a non-rotative sleeve in which said shaft is journaled, a transmitter frame in which said sleeve is slidably mounted, said frame being formed with a lubricant reservoir, a lubricant duct connecting said sleeve to said reservoir, and means for sliding said sleeve.

15. In a power-transmitter, a driving clutch-element, a driven clutch-element, a shaft carrying said driven clutch-element, a non-rotating sleeve in which said shaft is journaled, a transmitter frame in which said sleeve is slidably mounted, said frame being formed with a lubricant reservoir, an oil duct carried by said sleeve and fitted with wicking extending into said reservoir, and means for sliding said sleeve.

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

PARK A. HERR.