

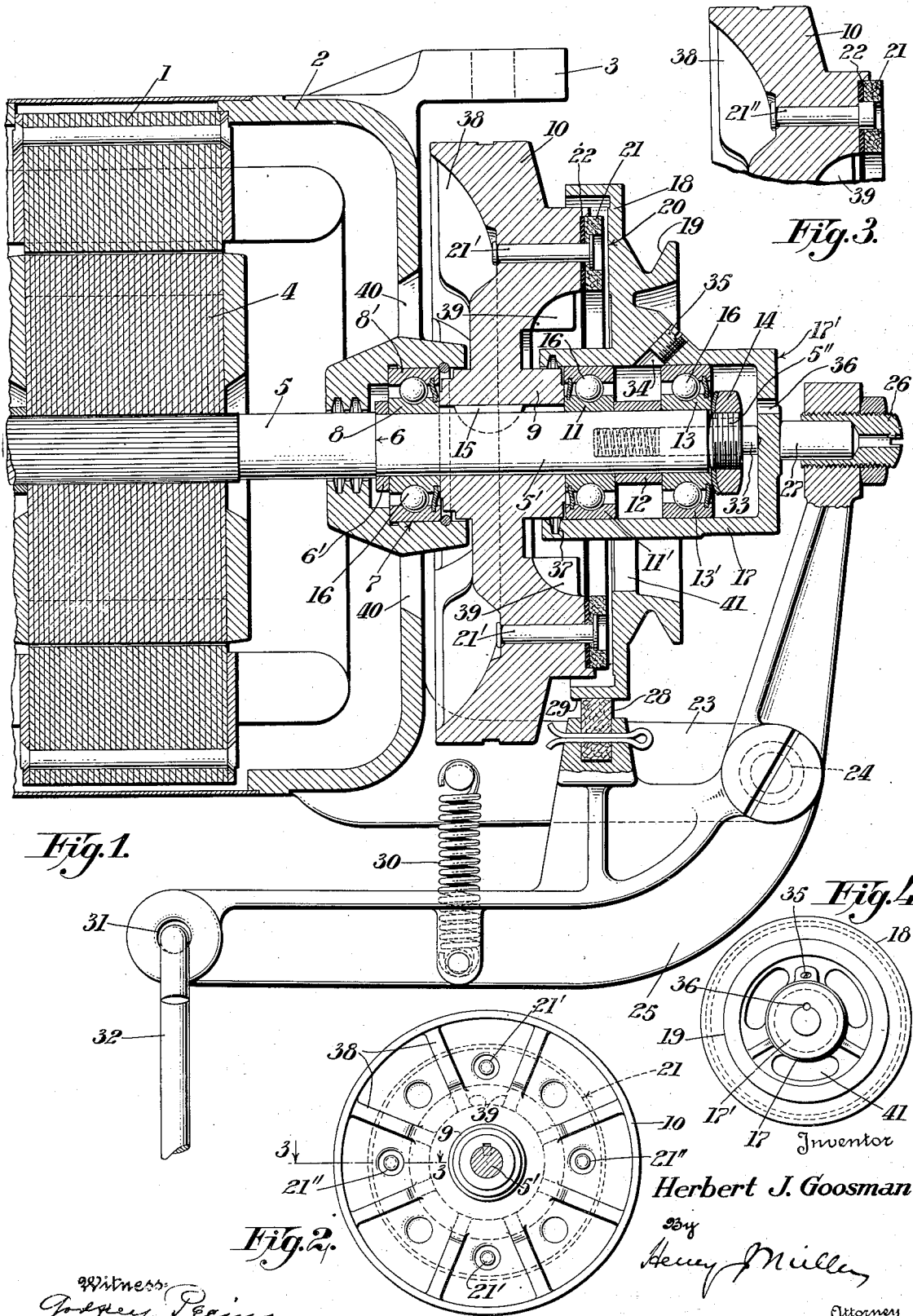
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POWER TRANSMITTER

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POWER TRANSMITTER

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5 Claims. (Cl. 192—18)

This invention relates to power-transmitters, more particularly of the treadle-controlled clutch and brake type commonly used on power benches for driving sewing machines, and has for an object to provide a power-transmitter of simplified and compact construction in which frictional losses are reduced to a minimum and which operates to pick up the driven load quickly and without noise or chatter.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations, and arrangements of parts hereinafter set forth and illustrated in the accompanying drawing of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the accompanying drawing, Fig. 1 is a longitudinal vertical sectional view of an electric power-transmitter embodying the invention. Fig. 2 is a back face view on a reduced scale of the live clutch-element of the transmitter. Fig. 3 is a section on the line 3—3, Fig. 2, and Fig. 4 is an outer end-face view of the driven disk on a reduced scale.

1 represents the laminated stator or field frame on an electric motor which is mounted as usual between a pair of end-bonnets, one of which is shown at 2, having attaching feet, one of which is shown at 3, whereby the motor may be mounted on the under side of the top board of a power-bench carrying a machine or other device to be driven.

4 represents the rotor of the motor which is fixed to the power-shaft 5 having a shoulder at 6 within the bearing pocket 7 in the end-bonnet 2 through which the outboard projection 5' of the motor-shaft extends.

Clamped in stacked relation upon the outboard projection 5' of the motor-shaft and against the shoulder washer 6', are the following elements in the order named, to wit: first, the inner grooved race-ring 8 of a conventional ball-bearing; second, the hub 9 of the live clutch-element 10 in the form of a heavy fly-wheel; third, the inner grooved race-ring 11 of a second conventional ball-bearing; fourth, a spacing collar 12; and fifth, the inner grooved race-ring 13 of a third conventional ball-bearing; all of which parts are clamped upon the power-shaft extension 5' by means of the clamping nut 14 screwed onto the threaded end 5'' thereof. The live clutch-element 10 is also fixed on the shaft extension 5' by the usual key or spline 15. The three conven-

tional ball-bearings referred to also respectively include the outer grooved race-rings 8', 11' and 13' with the usual balls 16 between the respective pairs of rings.

The first ball-bearing 8, 8' is seated in the pocket 7 of the motor end-bonnet 2 and constitutes one of the main motor-shaft bearings.

Slidably mounted on the outer race-rings 11' and 13' of the spaced coaxial second and third ball-bearings is the cup-shaped hub 17 of the driven clutch-disk 18 which is formed with a belt-pulley groove 19 and a flat clutch-face 20. The live clutch-element 10 has connected thereto by rivets 21' and driving pins 21'' the friction-clutch ring 21 of any suitable clutch facing material backed in the present instance with a thin layer of rubber 22 preferably vulcanized thereto. It is found that a thin rubber backing for the clutch facing 21 eliminates objectionable noise and chatter when the clutch-elements are engaged to pick up the load belted to the pulley 19.

The end-bonnet 2 is formed with an arm 23 on which is fulcrumed at 24 the usual treadle-operated clutch-controlling and braking lever 25 having at its upper end the adjustably screw-threaded holder 26 for the oil-soaked wooden push-pin 27 applied centrally of the closed outer end-face 17' of the driven pulley hub 17. The lever 25 has pinned thereto the usual leather brake-shoe 28 applied to the rim 29 of the driven disk 18. The spring 30 between the lever 25 and its supporting arm 23 urges the lever 25 in a direction to interrupt driving relation between the clutch-disks and to apply the brake 28 to the driven disk 18. The eyed end 31 of the lever 25 is to be connected by a suitable rod 32 to an operating treadle (not shown). A spring-pressed plunger-pin 33 within a central hole in the free end of the shaft-extension 5' pushes against the inner end-wall of the cup-shaped hub 17 of the driven clutch-element to carry the latter away from the driving element when the pressure of the push-pin 27 on the outer end-face 17' is relieved.

Lubricant, such as conventional ball-bearing grease, may be introduced into the cup-shaped hub 17 through the duct 34 normally closed by the screw-plug 35. The end-wall of the cup-shaped hub 17 is provided with an air vent hole 36.

The hollow hub 17 of the driven clutch-disk overlaps the hub 9 of the driving clutch-disk and there is preferably provided in the overlapping portion of the hub-member 17 a lubricant-catching groove 37.

By slidably mounting the cup-shaped hub of the driven clutch-member on the outer race-ring or rings of one or more conventional ball-bearings, the inner ring or rings of which are fixed to the power-shaft, certain important advantages are realized. First, a large sliding bearing surface area is provided with little or no relative rotary motion between the parts in sliding engagement. This practically eliminates wear between the slidably engaged parts and, at the same time, frictional losses are reduced to a minimum by the antifriction balls. Second, the lubricant within the cup-shaped hub cavity is thrown by centrifugal force toward the inner cylindrical wall thereof where the sliding engagement with the outer ball-race rings occurs. Lubricant thrown toward the inner wall of the hub 17 is also picked up by the balls 16 therewithin which are effectively lubricated.

By disconnecting the fulcrum-screw 24, and dropping the lever 25, the driven pulley element 18 may be readily removed and replaced by one of larger or smaller pulley diameter to meet any particular speed-requirements of the device to be driven.

The driving wheel 10 is preferably formed with radial fan vanes 38 and 39. The vanes 38 suck air through the holes 40 in the motor end-bonnet 2 and ventilate the motor. The vanes 39 ventilate the clutch by increasing the circulation of air between the driving and driven clutch faces; the air entering through the holes 41 in the driven disk 18 and being propelled outwardly between the separated friction-clutch faces 20, 21.

The invention is not to be understood as limited to the forms and arrangements of parts shown and described as such forms and arrangements are merely illustrative of the invention.

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

1. In a power-transmitter, a power-shaft, a continuously running live clutch-element fixed to said shaft, a ball-bearing carried by said shaft adjacent said live clutch-element and comprising inner and outer ball-race rings the inner of which is fixed in position upon said shaft, a driven clutch-member and belt-pulley slidably supported by the outer ball-race ring, and means for sliding said driven clutch-member upon said outer ball-race ring into working engagement with said live clutch-element.

2. The combination with a continuously running power-shaft and a live clutch-element fixed thereto, of spaced ball-bearings coaxial with and carried by said shaft, each of said ball-bearings comprising inner and outer ball-race rings and a series of balls between said rings, and a driven clutch-element having a hub slidably mounted on the outer race-rings of said ball-bearings.

3. In an electric power-transmitter, a motor having a frame, a power-shaft journaled in said frame and having an outboard projection, a live clutch-element fixed to and carried by the out-

board projection of said power-shaft, a pair of spaced conventional ball-bearings each having grooved inner and outer race-rings and a series of balls between said rings, the inner rings of said ball-bearings being fixed in coaxially spaced relation upon the free end-portion of said power-shaft, a driven clutch-member and belt-pulley freely slidable on the outer race-rings of said ball-bearings, and means for sliding said driven clutch-member on said outer race-rings into working engagement with said live clutch-element.

4. In an electric power-transmitter, a motor having a frame, a power-shaft journaled in said frame and having an outboard projection, a live clutch-element having a friction clutch-face and a cylindrical hub fixed to the outboard projection of said shaft, a pair of spaced conventional ball-bearings each having grooved inner and outer race-rings and a series of balls between said rings, the inner rings of said ball-bearings being fixed in coaxially spaced relation upon the free end-portion of said power-shaft, a driven clutch-member and belt-pulley having a hollow cup-shaped hub freely slidable on the outer race-rings of said ball-bearings and overlapping the cylindrical hub of said live clutch-element, means for sliding said driven clutch-member on said ball-bearings into working engagement with said live clutch-element, and a lubricant-catching groove in the portion of said hollow hub which overlaps the hub of said live clutch-element.

5. In an electric power-transmitter, a motor having a frame including an end-bonnet and a shouldered power-shaft projecting outwardly from said frame through said end-bonnet, a live clutch-element keyed to said power-shaft, three ball-bearings on said power-shaft each of which comprises inner and outer grooved ball-race rings and a series of balls between said rings, a spacing collar on said shaft for the inner race-rings of two of said ball-bearings, said live clutch-element, ball-bearings and spacing collar being stacked upon said shaft in the following order, to wit: first, one of said ball-bearings, second, the live clutch-element, third, another of said ball-bearings, fourth, the spacing collar, and fifth, the third of said ball-bearings, a clamping nut on said shaft for holding the inner race-rings of said ball-bearings together with the hub of said driving clutch member and said spacing collar tightly clamped against the shoulder on said power-shaft, a driven clutch member and belt-pulley having a cup-shaped hub slidable on the outer race-rings of the two ball-bearings which are separated by said spacing collar, a pocket in said end-bonnet receiving the first ball-bearing adjacent the shoulder on said power-shaft, and means for sliding said driven clutch member and belt-pulley into working engagement with said live clutch-element.

HERBERT J. GOOSMAN.

CERTIFICATE OF CORRECTION.

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Patent No. 2,048,501.

July 21, 1936.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 42, claim 1, strike out the words "continuously running" and insert the same before power-shaft in line 41, same claim; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of September, A. D. 1936.

Leslie Frazer
Acting Commissioner of Patents.

(Seal)