

Aug. 7, 1962

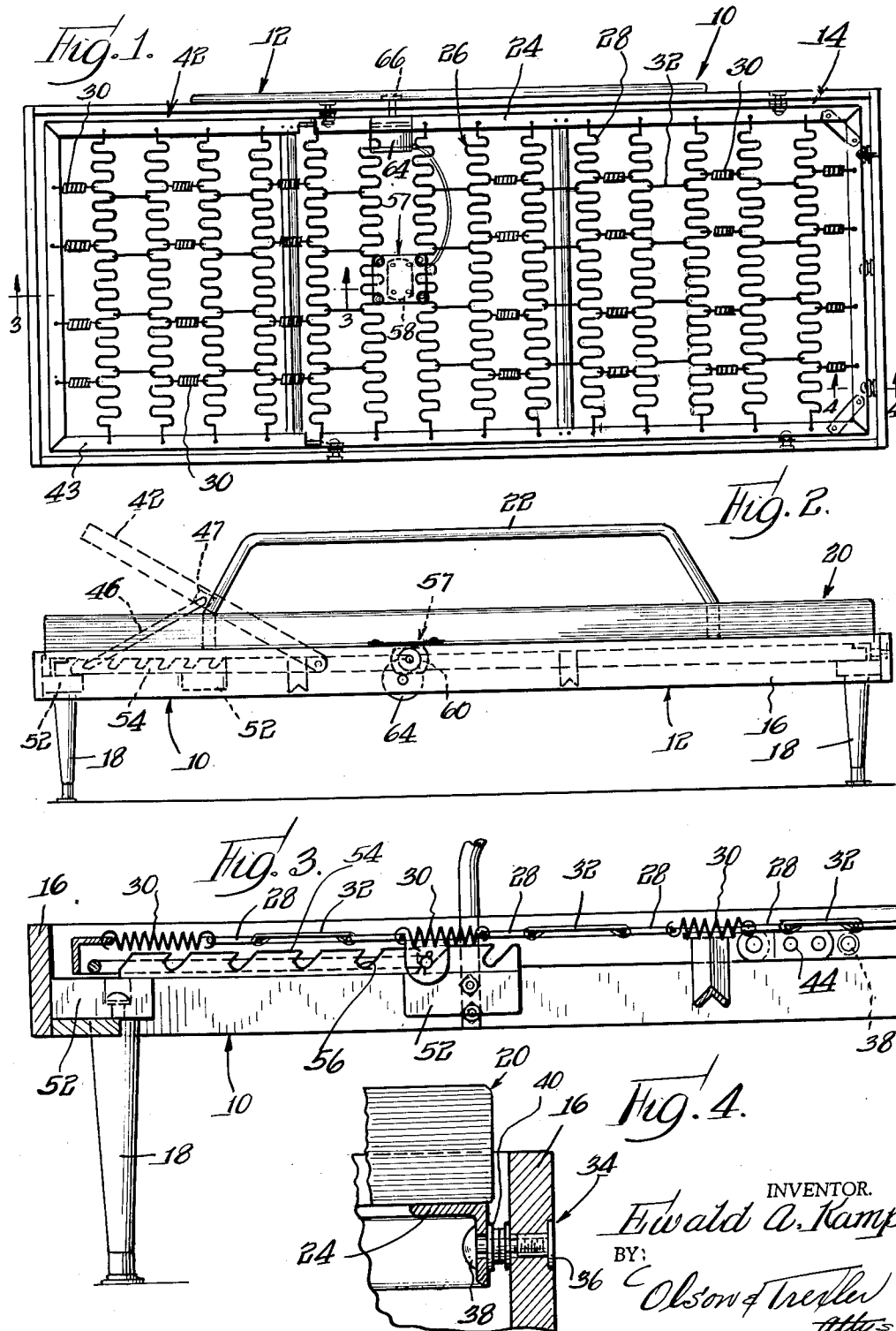
E. A. KAMP

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VIBRATION SPRING STRUCTURE FOR MASSAGE LOUNGE

Filed March 18, 1958

2 Sheets-Sheet 1



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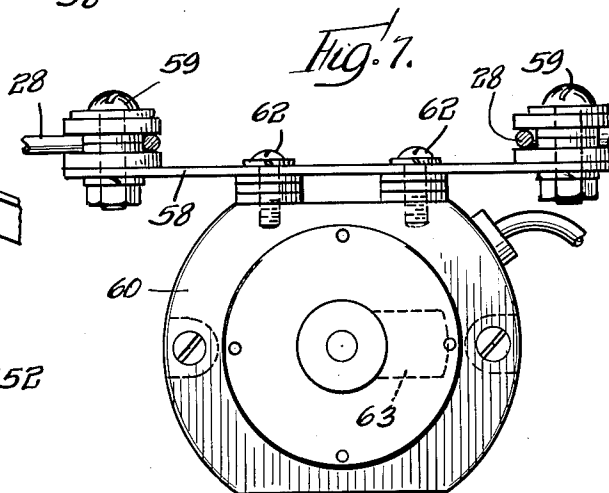
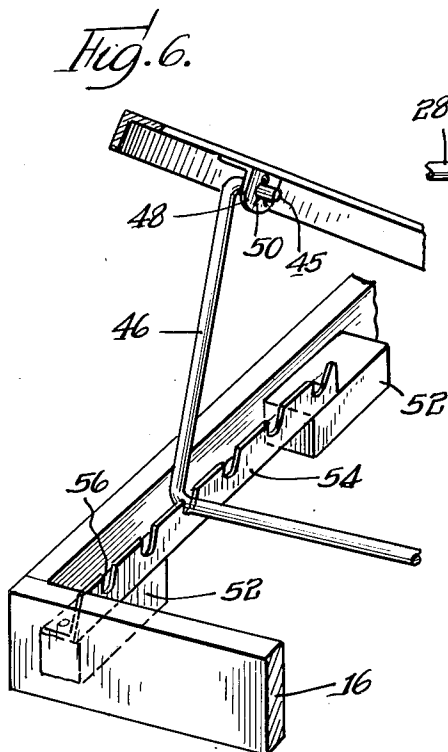
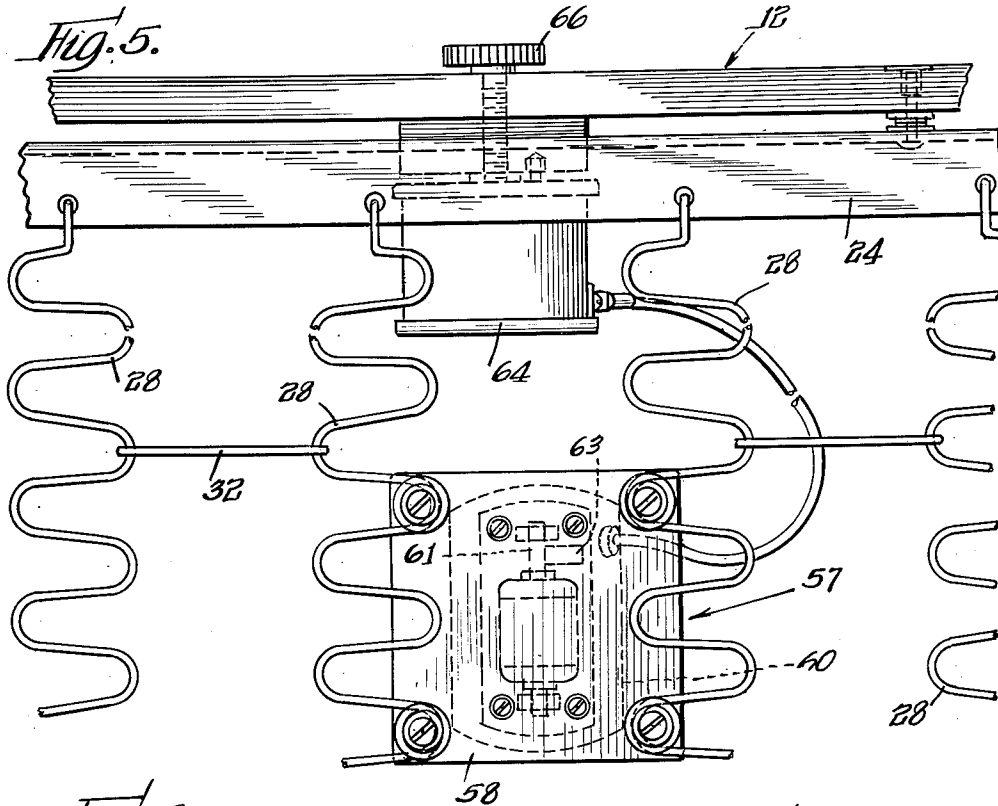
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VIBRATION SPRING STRUCTURE FOR MASSAGE LOUNGE

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VIBRATING SPRING STRUCTURE FOR MASSAGE LOUNGE

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This invention relates to an improvement in an article of furniture and more specifically to an improved vibrating spring structure for said article.

It is recognized that a high frequency low amplitude horizontal vibration in a supporting surface is restful to a person reclining on said surface. A person reclining on a vibrating spring structure receives a vibration which relaxes tired and tense muscles and sleep is induced thereby. Various schemes of vibrating a reclining surface have been used, and in most instances, a vibrator is applied to the supporting frame which supports the reclining surface. The vibrations induced thereby are found to be objectionable since there is noise produced by the supporting frame vibrating on a supporting floor. The vibration of a supporting frame on a floor is particularly objectionable in an apartment building where occupants have an apartment below. The vibration of the supporting frame also tends to loosen the joints of the members constituting the supporting frame and thereby ruin the structure. A further objection to the supporting frame vibrator is that the vibrations are not applied to the reclining surface, but rather to the supporting member, thus a good portion of the vibrations are absorbed by the reclining surface before the person reclining thereon receives any benefit from the vibrator. In certain instances where the vibrations are applied directly to the reclining surface, the reclining surface transmits the vibrations to a supporting structure and the objections of noise and support member damage are also encountered. Therefore, one of the objects of the herein disclosed invention is to provide a vibrating spring structure having a vibrator attached thereto in a manner so that vibrations from the vibrator are transmitted to a person reclining on the spring structure.

A further object of the herein disclosed invention is to provide a spring structure having a vibrator in which an optimum frequency is used in the vibrator with the spring structure.

A still further object of the herein disclosed invention is to provide a spring structure having a vibrator included therewith wherein the energies of the vibrator are principally directed to horizontal vibrations of the spring structure.

Another object of the herein disclosed invention is to provide a spring structure including a vibrator wherein the maximum vibration is concentrated at the center of gravity of the person reclining on the spring structure and minimal vibrations occur at the periphery of the spring structure.

Other objects and uses of the herein disclosed invention will become apparent to one skilled in the art upon reading the following specification in light of the accompanying drawings, in which:

FIG. 1 is a plan view of a spring structure embodying the herein disclosed invention;

FIG. 2 is a side elevation of a lounge including the spring structure shown in FIG. 1;

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FIG. 3 is a partial cross sectional view taken on line 3—3 of FIG. 1;

FIG. 4 is a partial cross sectional view taken on line 4—4 of FIG. 1;

FIG. 5 is an enlarged fragmentary plan elevation showing the vibrator and associated spring structure;

FIG. 6 is an enlarged perspective view of a fragment of a back rest support; and

FIG. 7 is an end view of the vibrator shown in FIG. 5.

Referring now to the drawings, FIGS. 1 and 2 show a reclining lounge, generally indicated by numeral 10, which includes a supporting structure, generally indicated by numeral 12, and a spring structure generally indicated by numeral 14.

The support structure 12 includes a support frame 16 and four legs 18 positioned at corners of the support frame 16, supporting said frame.

A mattress, generally indicated by numeral 20, is positioned on the spring structure 14 within the support member 16 as may be seen in FIG. 2. A lounge back, generally indicated by numeral 22, is fixed to the support member 16 by a plurality of nuts and bolts, and the lounge back 22 provides a support for a bolster on mattress 20, though the bolster is not shown.

The spring structure 14 includes a generally rectangular spring frame 24, and a spring assembly, generally indicated by numeral 26, mounted within the frame 24. The spring assembly 26 includes a plurality of zig zag spring units 28, laterally mounted within the frame 24. The spring units are connected to adjacent spring units by a plurality of resilient coil springs 30 and wire links 32 alternately engaging spring units as may be seen in FIGS. 1 and 3, which coil springs and links provide a linking means to link the spring units in a vibration transmitting system. The ends of the spring assembly 26 are connected to the spring frame 24 by resilient coil springs.

The frame 24 is attached to the support 16 by mounting means 34 shown in FIG. 4. Mounting means 34 includes a nut 36 embedded in support 16, a bolt 38 extending through spring frame 24 threaded into the nut 36, and a pair of washers 40 are mounted on the bolt between the support and the frame 24.

The spring structure 14 includes a backrest 42 which includes a generally U-shaped pivoting portion 43 of the spring frame which is attached to the remainder of the frame by hinges 44. The backrest 42 includes a support 46 which is generally U-shaped and has one leg pivotally connected to one side of the pivoting portion 43 of spring frame 24 by means of ear 48 through which a finger 45 projecting from the support 46 extends. The finger is retained in assembled relationship with the ear by a key 50 as shown in FIG. 6. It is understood that the other leg of the U-shaped support is connected to the opposite side of the frame portion 43 by similar means, generally indicated by numeral 47 in FIG. 2.

Looking now to FIGS. 2, 3 and 6, pairs of support blocks 52 are respectively fixed to opposite sides of the support member 16 and support racks 54 are respectively mounted on said pairs of blocks. The racks 54 contain a plurality of positioning slots 56 for receiving the support 46.

A vibrating assembly is mounted partially on the spring assembly 26 and partially on the support member 16. The vibrating assembly includes a vibrator, generally indicated by numeral 57, having a motor plate 58 dis-

posed in substantially the same plane as the springs and attached to a pair of zig zag spring units 28 by plate mounts 59 as may be seen in FIGS. 1, 5 and 7. A vibratory energy source 60, in the form of electric motor having a rotor shaft 61 disposed parallel to the spring units 28 and an unbalanced weight 63 fixed to the shaft, is fixed to the plate 58 by means of screws 62. The plate 58 is fixed proximate the central portion of the spring assembly where the center of gravity of a person reclining on the lounge is normally positioned.

The electric motor is connected to a source of electrical energy through a rheostat 64, which is fixed to the support 16. A rheostat control knob 66 extends through the support 16 to provide a convenient means for regulating the rheostat 64, thus regulating the speed of the electric motor. The rheostat, in effect, becomes a frequency control means for the source of vibrating energy.

The backrest support 42 may be adjusted to an inclined position as shown in phantom view in FIG. 2 to raise the occupant's back from the horizontal. The degree of incline is controlled by positioning the support 46 in a selected slot 56. The nearest slots to the end of the support member 16 provide a smaller incline from the horizontal, while the slots proximate the center of spring assembly provide a greater incline from the horizontal.

When the motor is energized, the plate 58 tends to vibrate in a circular path having a generally horizontal axis since the axis of the motor shaft is disposed substantially horizontally. The axis of the electric motor is also disposed parallel to the longitudinal axes of the spring units 28 so that the vibrations are transmitted longitudinally along the spring assembly from one spring to the next or, in other words, transversely of the spring units. However, when a person reposes on the mattress 20, the center of gravity of the person is usually proximate the vibrator, and the circular vibration is flattened out to an elliptical pattern by the force of the person's weight. Thus, the vertical component of the vibratory motion is restricted, and the greatest vibration is extended in a lateral direction, thereby the vibratory energy is principally expended in a horizontal plane.

It has been found that the optimum speed of rotation of the electric motor is between 1,500 and 3,000 r.p.m. and the best results have been achieved at about 2,500 r.p.m. The rheostat may be used to vary the speed of the electric motor so that the vibrator vibrates at the natural frequency of the spring assembly or in a harmonic thereof. The vibration of the spring assembly at its natural frequency makes optimum use of the vibrational energy and the rheostat may be used as a vibrator control means to adjust the vibrator for different weights of different individuals who use the lounge.

As mentioned above, the vibrations are extended primarily longitudinally of the spring assembly. The plate 58 vibrates the spring unit connected to it directly and the adjacent spring units through the links 32. The next spring units are vibrated through the resilient coil springs 30 which produce a slight dampening effect and the entire system absorbs all, or substantially all, of the vibrations so that the spring frame 24 is not materially vibrated. Inasmuch as the vibrations are directed longitudinally of the spring assembly, there is no lateral component of the vibrating force of substantial magnitude, but whatever lateral vibrating force there may be is absorbed by the spring units 28. Thus, the spring assembly absorbs substantially all of the vibrating energy so that there are no vibrations transmitted to the support member 16 and the legs 18; whereby undesirable noise is not created and there is no undue strain on the support member 16.

While a specific embodiment of the instant invention has been shown and described herein, it is obvious that those skilled in the art may make variations and modifications of the herein disclosed invention without de-

parting from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. An article of furniture including a support frame, a spring structure mounted within said support frame, a backrest cooperating with the spring structure and the support frame for inclining a portion of the spring structure from the horizontal, said spring structure comprising a spring assembly including a plurality of zig zag spring units substantially parallel to each other, said spring units alternately connected to each other by resilient coil springs and links, a spring frame engaging opposite ends of each of said zig zag spring units, a plurality of coil springs connecting opposite ends of said spring assembly to the spring frame, a vibrator mounted between a pair of adjacent zig zag springs, whereby the vibrator emits vibratory energy to the adjacent zig zag spring units and the vibratory energy is transmitted transversely to the adjacent spring units through the coil springs and links and with the coil springs producing a dampening effect so that the vibratory energy is substantially absorbed prior to the transmission of said energy to the spring frame.

2. An article of furniture having a support member, a bolster back attached to said support member, and a spring structure mounted within said support member, said spring structure including a backrest inclinable to the horizontal, a spring frame mounted within the support frame, a plurality of zig zag spring units substantially parallel to each other attached to the opposite sides of the spring frame, means including alternating sets of substantially rigid and resilient connectors connecting adjacent spring units to produce a dampening effect between the spring units connected by said resilient connectors, and a vibrator mounted in a central portion of the spring structure, whereby said vibrator emits vibratory energy transverse to the spring units, which vibratory energy is substantially absorbed prior to transmission to the spring frame.

3. An article of furniture having a support frame, a plurality of legs attached to said frame, a bolster support attached to said support frame, and a spring structure mounted within the support frame, said spring structure including a backrest pivotally mounted within said support frame including a portion of the spring structure inclinable from the horizontal to provide a convenient back support for an individual reclining on the article of furniture, said spring structure including a spring frame attached to the support structure, a plurality of zig zag spring units positioned substantially parallel to each other attached to opposite edges of the spring frame, a plurality of non-resilient links connecting alternate adjacent spring units, a plurality of resilient coil springs connecting alternate adjacent spring units and connecting end spring units to the ends of the spring frame and producing vibration dampening effect, a vibrator attached to a pair of adjacent spring units proximate the center of the spring structure, said vibrator including a vibratory plate fixed to a pair of adjacent spring units and an unbalanced electric motor fixed to the plate, said motor rotatable in an axis substantially parallel to the zig zag spring units, a rheostat controlling the speed of rotation of said unbalanced motor, whereby the rate of vibration of the electric motor may be adjusted to be equal to or a harmonic of the natural frequency of the zig zag spring units and the vibratory energy transmitted from the vibrator may be substantially absorbed prior to the transmission of the vibratory energy to the spring frame.

4. A spring structure having a spring frame, a plurality of zig zag spring units mounted within the spring frame substantially parallel to each other, connecting means including a plurality of coil springs and a plurality of wire links alternately connecting adjacent zig zag spring units, a vibrator mounted between two juxtaposed zig zag spring units, whereby the vibrator transmits vibratory energy to said juxtaposed spring units which units transmit the vibratory energy to other spring units through said connecting means with said coil springs operating to dampen the

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vibratory energy prior to transmission thereof to the spring frame.

5. A spring structure comprising a spring frame, a spring assembly including a plurality of zig zag spring units traversing said spring frame in substantially coplanar and parallel relationship, a vibrator connected to a pair of adjacent zig zag spring units and generally in the central portion of the spring assembly, links connecting a second pair of zig zag spring units with the spring units connected to the vibrator, and coil springs connecting the said second spring units to a third pair of spring units for dampening the vibratory energy transmitted to the second

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pair of spring units through said links whereby the vibratory energy is substantially absorbed without transmission thereof to the spring frame.

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